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[redacted]

To:	Timaru District Council
Applicant:	Submitter 227 – Westgarth and Gibson
From:	Davis Ogilvie (Aoraki) Ltd
Date:	10 March 2025
Subject:	Response to Hearing G Preliminary s42A report

[redacted]

This memo has been prepared in response to the Preliminary s42A report prepared by Matt Bonis in October 2024, and subsequent clarification provided by Council and its representatives in the months since.

In his preliminary report, Mr Bonis identifies the purpose and scope of his report, and acknowledges the need described by Panel Minute 6, for more time for assessment and reporting than usual.

In his report, Mr Bonis identifies the information required and detailed this in a checklist for submitters **(Appendix 1)** to respond to. In addition to the general checklist, the following additional information is sought:

a) The existing environment, including configuration and fragmentation of titles and geophysical boundaries that would delineate the requested zone boundaries.
b) Application of the requirements of the NPS-HPL, specifically for Sub No. 227.1 Gibson (as it relates to the extended area related to this submission)
c) Application of requirements in the NPS-UD especially in terms of development capacity beyond 'at least sufficient development capacity' for the purpose of Policy 2, and implications for integrated infrastructure and funding decisions (Objective 6).
d) Consideration against the relevant statutory framework for achieving a consolidated pattern of development (as required by the CRPS and notified PDP) for all submissions listed, which includes the provision of a 'coordinated pattern of development' including implications for amending timeframes associated with SCHED-15
e) Service provision as set out in Attachment B.

Since the original submission, Council have commissioned technical work and assessments for the preparation of the Development Area Plan (ODP/DAP) for FDA areas 1, 2 and 4. **Council's draft DAP** is contained in **Appendix 3** which will be referenced throughout this document. Other technical work may also be referenced in individual sections below.

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The subject site is located at 82 Kellands Hill Road, Timaru, at the northern extent of Timaru's urban environment (as shown in **Figure 1 – 4** below). The subject site is intersected by multiple waterways (Oakwood Stream and Washdyke Creek to the North and Taitarakihi Creek to the south). The underlying zoning of the site is General Rural (GRUZ) under the Proposed Timaru District Plan, and part of the land is included within Future Development Areas 4 and 1 (FDA4 and 1) as show in **Figures 1 – 4** below.

Overall, the submitter is supportive of the Proposed Timaru District Plan (PTDP), as it relates to their site, and in particular the recognition that the southern portion of the site is suitable for urban development. However, the submitter seeks two changes to the FDA areas as mapped under the Proposed Timaru District Plan (PTDP), as outlined below:

1. An immediate rezone from GRUZ to GRZ, as it relates to FDA1. The PTDP was publicly notified on 22 September 2022, and since then Council has prepared a draft **Development Area Plan (DAP)** covering the site, based on initial technical investigations and reports. Also refer to **Appendix 3**;
2. To amend the common boundary of FDA1 and FDA4, and additionally move the boundary for FDA4 further north. The suggested changes to the FDA boundaries are to better coincide with natural features, land use and future development feasibility. **Figure 5** below shows the proposed changes.

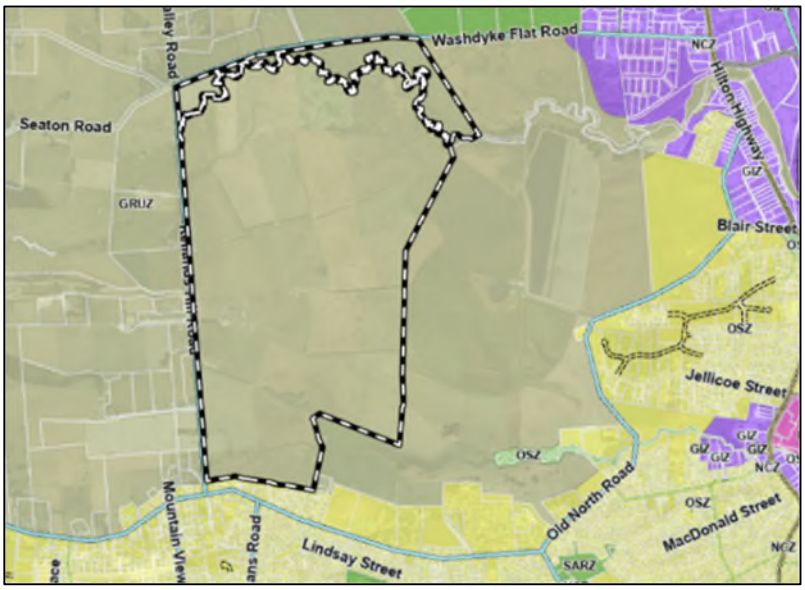

***Figure 1**: Proposed Timaru District Planning Maps, showing relevant zoning.*

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***Figure 2**: Proposed Timaru District Planning Maps, showing FDAs within the site.*

***Figure 3**: Proposed Timaru District Planning Maps, showing FDA1 and its relationship to FDA4*

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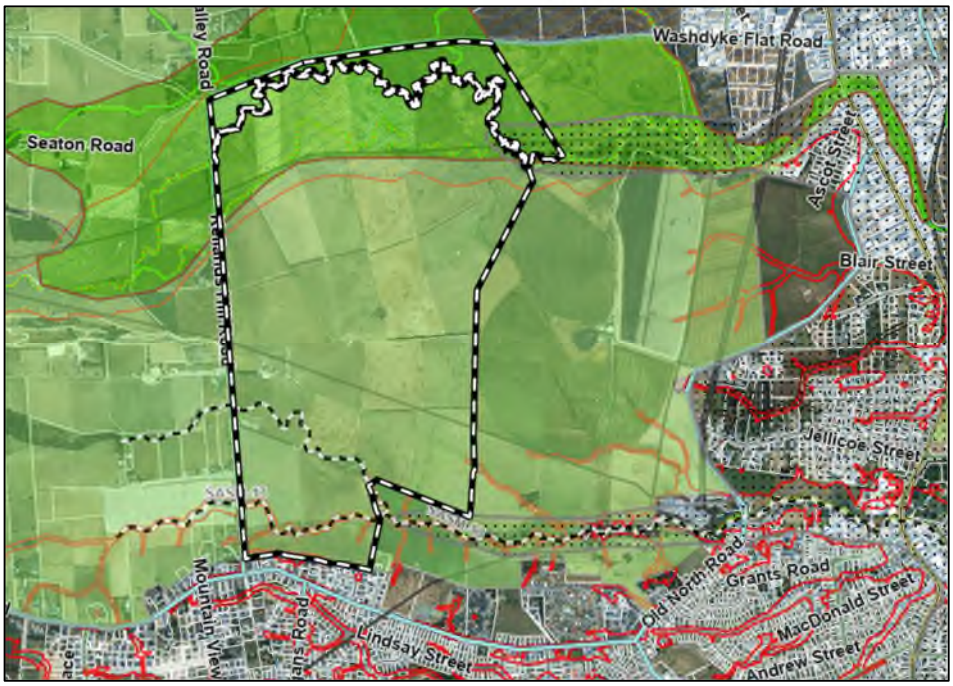

***Figure 4**: Proposed Timaru District Plan Planning Maps, showing relevant overlays, including Flood Assessment Area, SASM-3 & 13, Esplanade Provision, Public Access Provision and Versatile Soils. The area of the site subject to versatile soils overlay is also classed LUC 2 land. The site also contains LUC 3 Land.*

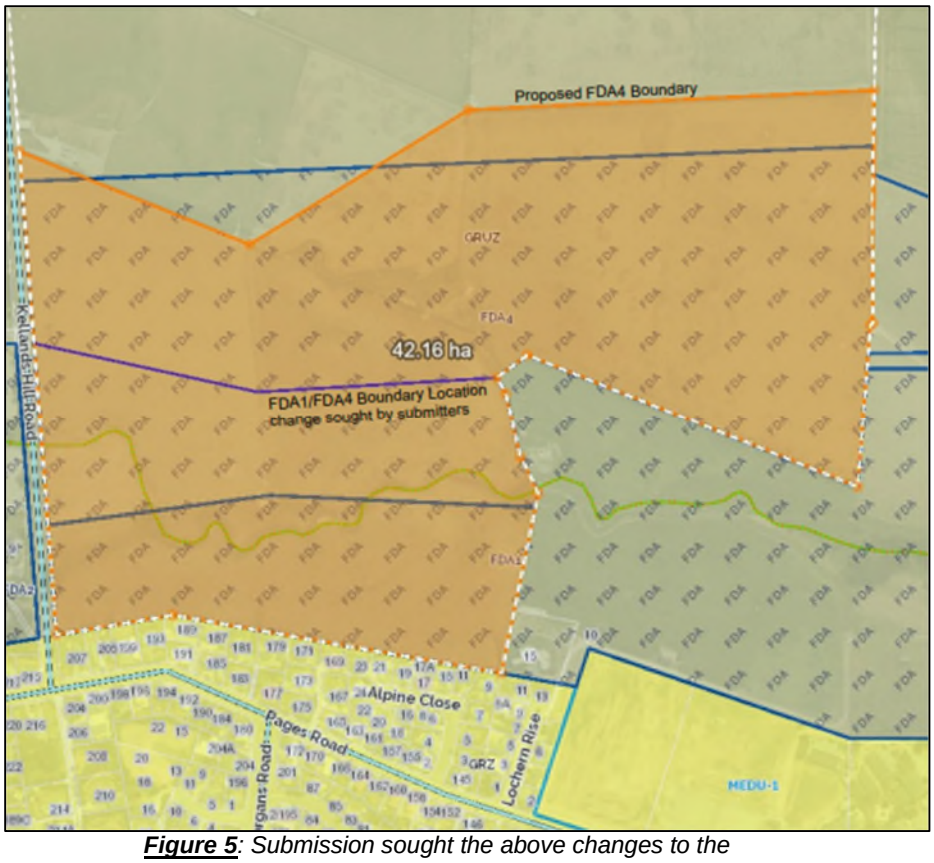

***Figure 5**: Submission sought the above changes to the proposed boundaries of FDA1 and FDA4*

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NPS-UD

Question 1: *What is the contribution of the rezoning (or amendment in timing associated with SCHED-15 (FDAs)) in terms of the provision (residential / rural lifestyle – yield, density; and business - area) in relation to the Council's provision of 'at least' sufficient development capacity (**Policy 2**) given the Property Economics analysis (**Section 8**)?*

Neither the **National Policy Statement on Urban Development (NPS-UD)** nor the **Canterbury Regional Policy Statement (CRPS)** explicitly **require a minimum yield** for residential development. However, both policies encourage increased housing supply and density, which can indirectly influence yield expectations.

NPS-UD (National Policy Statement on Urban Development)

- The NPS-UD **requires councils to enable greater housing density**, although this is primarily targeted at Tier 1 urban areas like Auckland, Wellington, Christchurch, and Hamilton; through '**General Compliance',** Tier 3 councils must also ensure their district plans align with the NPS-UD objectives, promoting well-functioning urban environments, so consideration of housing density is still important and requires some flexibility. The Planz -2022-GMS report, also stated this:

  > The NPS-UD places greater expectations on Tier 1[1] and 2[2] Councils, but Tier 3[3] (which includes Timaru) *local authorities are strongly encouraged to do the things that tier 1 or 2 local authorities are obliged to do under Parts 2 and 3 of this National Policy Statement, adopting whatever modifications to the National Policy Statement are necessary or helpful to enable them to do so[4].*

  So Council have a 'choice': which is an important reminder in the context of placing such significant weight on the Property Economics analysis and planning by the rear vision mirror (i.e. reliance on historical census data). Council are in fact 'strongly encouraged' and should 'adopt whatever modifications' they consider necessary, this can mean taking a more aspirational vision for our district implemented with suitable controls.

- While it does not **set a mandatory minimum yield**, it promotes **higher-density zoning and greater housing capacity**, giving Councils the opportunity to set/consider their own yield expectations in district plans. This provides Council with the ability to consider local contextual information, such as topography and housing typology demands that might influence yield. In this instance and relevant to the consideration of whether Council is providing for 'at least' sufficient development capacity we feel that the Property Economics report has potentially overlooked some of this local context information which results in their analysis potentially over estimating the available capacity. This is largely based on the understanding that within the GRZ zone, a lot size of 450m^2 has been used in their modelling to determine potential yield.

Considering the requirements of Policy 2 of the National Policy Statement on Urban Development (NPS-UD), the following response evaluates the contribution of rezoning or amendments in timing associated with FDA1 and FDA4 to the provision of sufficient development capacity in Timaru District.

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1. Residential Yield and Density

FDA1 and FDA4 Potential Contribution:

- These areas are identified as Future Development Areas (FDAs) under Schedule 15, meaning they are intended to provide additional residential capacity when required.
- Rezoning FDA1 and FDA4 can significantly contribute to residential yield by transitioning rural land into urban zones, enabling residential development and Timaru's urban boundary to logically extend northwards.
- Based on density benchmarks from similar greenfield developments (e.g., Christchurch and other regions), residential yields often range from 12–15 households per hectare, however, unlike large urban centres, local and/or site characteristics such as topography, geotechnical ground conditions, housing typology demands, feasibility of development and demographics play a key role in the likely 'realised' density. Looking in the vicinity of this site, topologies seen directly south of the site **(see Figure 6, below**), demonstrates density/yield at approx. 10HH/ha and looking around Hunter Hills and Meadowstone Street in the Gleniti Development zone density is more like 8HH/ha. Local demand in the vicinity of the submitters site seems to be driven by a need for larger residential section sizes and houses suited to families (Lot sizes 700-1000m^2), with a scattering of smaller sections (450-600m^2) potentially providing for retirees wanting to live in a higher value area with low maintenance yards. That said, where topography permits, density can be increased if market conditions demand which improves yield. So flexibility is needed and believed to be provided in the rules of the GRZ but the point is how anticipated yield and what has been modelled by Property Economics is affected by these characteristics.

***Figure 6**: Existing section size and housing typology directly south of the site*

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- This effect and rationale is demonstrated somewhat in the approach the DRAFT DAP design has taken, where the designers have included a range of typologies/building types, including higher density nodes, apartments and mixed use clusters. This subsequently helps reach a higher overall yield.
- From the DRAFT DAP information, it is difficult to count/determine for sure, however within the submitters FDA1 and FDA4 site boundary, we calculated from DAP Plan: 'Lot Sizes', an estimated yield of around 380-400 lots could be achieved for the site over the life of the plan. This gives a yield of between 9.4 – 10 HH/ha.

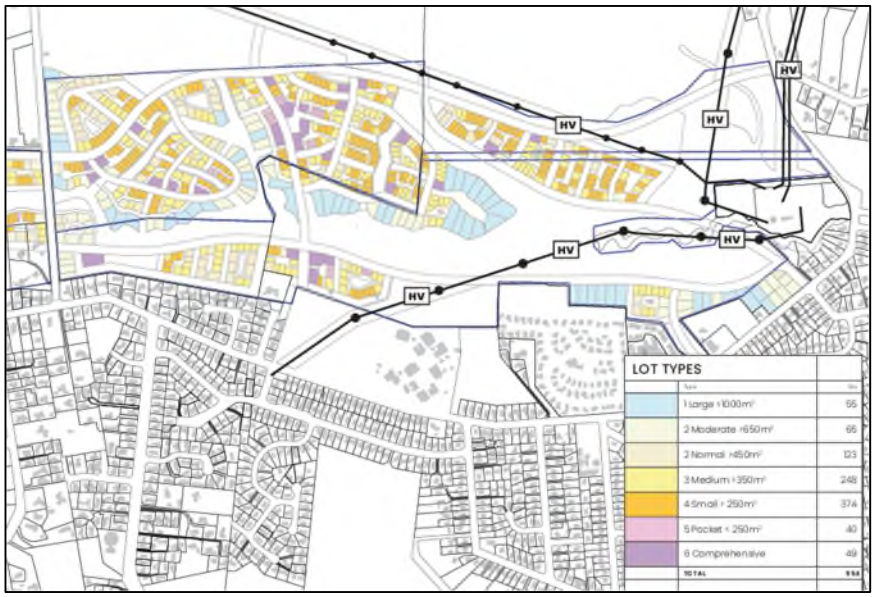

***Figure 7**: DAP Plan showing proposed Lot sizes*

- Furthermore, topography and achieving good urban design and environmental outcomes play a significant role in the overall yield also. In this case the rolling topography, desire for reserve and movement connectivity (car, bike, pedestrian), along with improved biodiversity (green belts) and stormwater management require more land than normal to be used for public spaces such as Roads and Reserves. See DAP in **Figure 8** below, with the green areas showing the extent of land required for Roads and Reserves which equates to approx. 20.21ha or 49.7% of the submitter site.

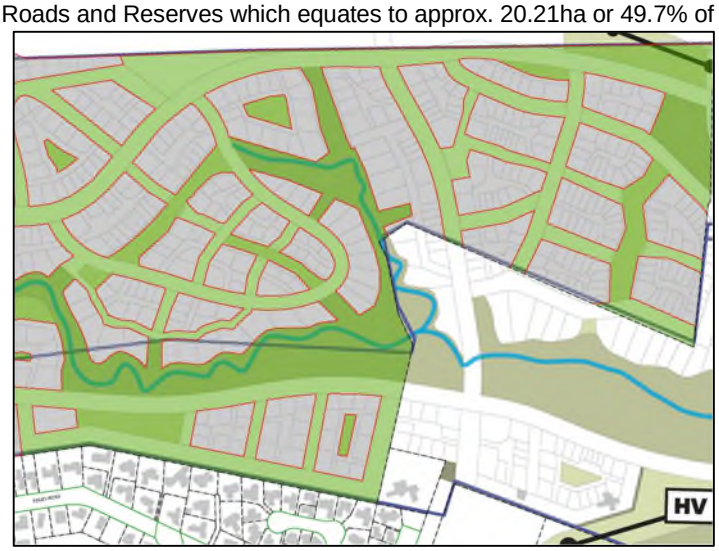

Figure 8: *Image of DAP*

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- These matters do not mean the site is unsuitable for urban growth, rather, through good planning and processes like completing the DAP work, the matters are considered and solutions incorporated within the design to ensure a well-functioning urban environment that is feasible to build and achieves good long term environmental outcomes.
- For the reasons outlined above, FDAs 1, 2 and 4 are a good example of why Council need to treat the Property Economics development capacity modelling for Timaru with caution, as it is understood that 450m^2 lot size has been used in their modelling assessment (i.e. being the minimum in the GRZ).
- This is supported by the market evidence within the Colliers, 2022 Timaru Residential Property Market Study commissioned by Council, which notes on page 13: *"Of note the average land area of a vacant section is 1,033sqm compared to 784sqm for the average house"*, both being well above the 450m^2 that seems to have been used. Even using an average of 12 HH/ha, which equates to a lot size of 833m^2 is substantially larger than 450m^2, which potentially represents that forecast capacity modelling could fall short by some 46% of projections. Thus putting into question whether 'at least' sufficient supply is being provided for.

Alignment with NPS-UD Policy 2:

- Policy 2 requires councils to provide "at least" sufficient development capacity for both short, medium and long-term housing needs. The Property Economics analysis in Section 8 of the s42A report indicates that current residential capacity exceeds medium-growth projections but falls short under high-growth scenarios.
- Additional information such as the Informetric's study indicates Timaru may have already exceeded the expected population growth as shown below:

  https://rep.infometrics.co.nz/timaru-district/population/growth

2021	48,500	0.4%	200
2022	48,600	0.2%	100
2023	49,600	2.1%	1,000
2024	50,100	1.0%	500

- Rezoning FDA1 and FDA4 would help address potential future shortfalls under high-growth scenarios, ensuring a buffer for housing demand.

2. Business Land Capacity

FDA1 and FDA4 Potential Contribution:

- While the proposed GRZ is focused on residential development, these FDAs and their geographical location within the context of the existing urban environment could potentially also accommodate mixed-use or business zones/nodes, depending on council priorities. This has been considered by the DRAFT DAP, which shows a potential Commercial node area, highlighted purple on the image below.

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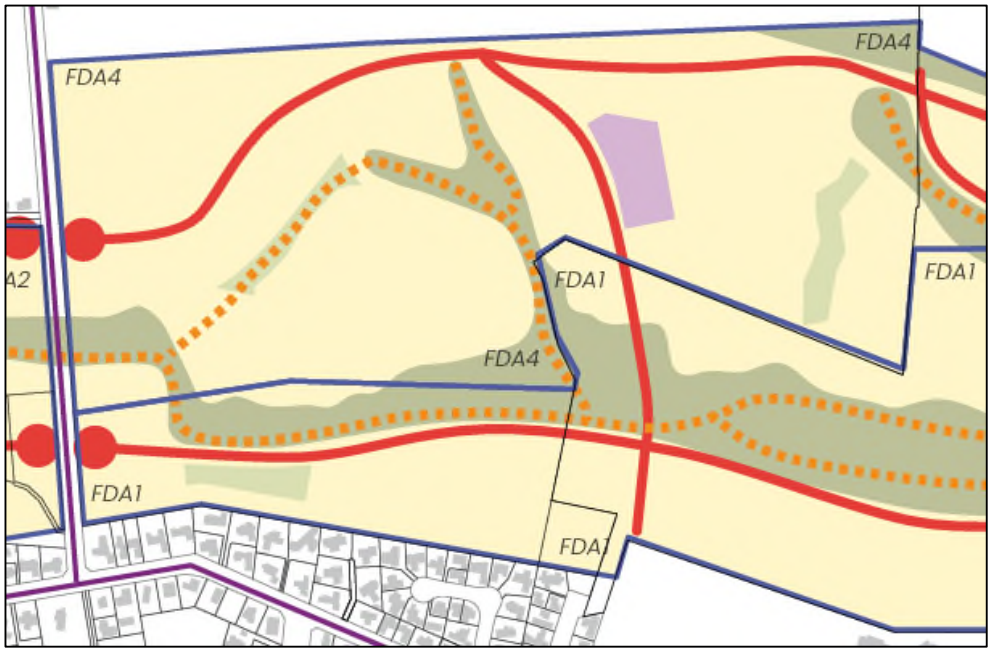

- Providing for such local commercial activities that support residential growth can provide 'local' opportunities, reducing reliance on vehicle travel and contributing to well-functioning urban environments.

Alignment with NPS-UD Policy 2:

- Providing sufficient business land is critical for supporting economic growth alongside residential development. If FDA1 or FDA4 includes provisions for business nodes, this would enhance their contribution to balanced urban growth.

Alignment with Property Economics Analysis

- The Property Economics analysis in Section 8 of the s42A report concludes that current residential capacity is sufficient under medium-growth projections but may fall short under high-growth scenarios.
- Rezoning FDA1 and FDA4 would provide additional flexibility to address potential high-growth demands while maintaining a buffer for long-term needs.

Rezoning or amending the timing of FDA1 and FDA4 can contribute meaningfully to Timaru District's ability to meet its obligations under NPS-UD Policy 2 by providing additional residential capacity and potential business opportunities. However, this contribution is contingent upon:

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1. Ensuring infrastructure readiness through alignment with council's LTP.
2. Maintaining adherence to Schedule 15 sequencing.
3. Demonstrating alignment with high-growth scenarios identified in the Property Economics analysis.

Question 2: *For residential and business rezonings how would the rezoning (or amendment in timing associated with SCHED-15 (FDAs)) contribute to 'well-functioning urban environments' (**Objective 1** and **Policy 1**) and align with responsibilities of the Timaru District Council to ensure decisions on urban development that affect urban environments are integrated with infrastructure planning and funding decisions (**Objective 6**)?*

Rezoning FDA1 and FDA4 for residential uses can contribute to "well-functioning urban environments" as defined by Objective 1 and Policy 1 of the NPS-UD, and how these rezoning decisions integrate with infrastructure planning and funding in alignment with Objective 6.

a. **Addressing Diverse Housing Needs (Policy 1(a)):**

- Rezoning FDA1 and FDA4 proactively addresses the *variety* of housing needs within the Timaru community, as emphasized by Policy 1(a) of the NPS-UD.
- While existing assessments (like the Property Economics analysis) may indicate a sufficient number of dwellings, this *does not* guarantee that the *types*, *prices*, and *locations* of these dwellings adequately meet the needs of the evolving community, as noted by the Novo Group memo **(Appendix 4)**.
- As Timaru's population ages, the rezoning must facilitate the development of a range of housing topologies, including smaller residential units and retirement villages to meet increasing demand. Simultaneously, recognizing the continued demand for standalone homes on larger lots (e.g., exceeding 450m²), the rezoning should provide options for families seeking larger properties, as is evident within the west Timaru area.
- The rezoning, therefore, needs to provide diverse housing options to meet the needs of different household sizes, incomes, and lifestyles. This has been appropriately considered by the Council commissioned DRAFT Development Area Plan work. See **Figure 7** 'Lot Type' DAP Plan snippet below, showing a concept of lot types considered for the submission site:

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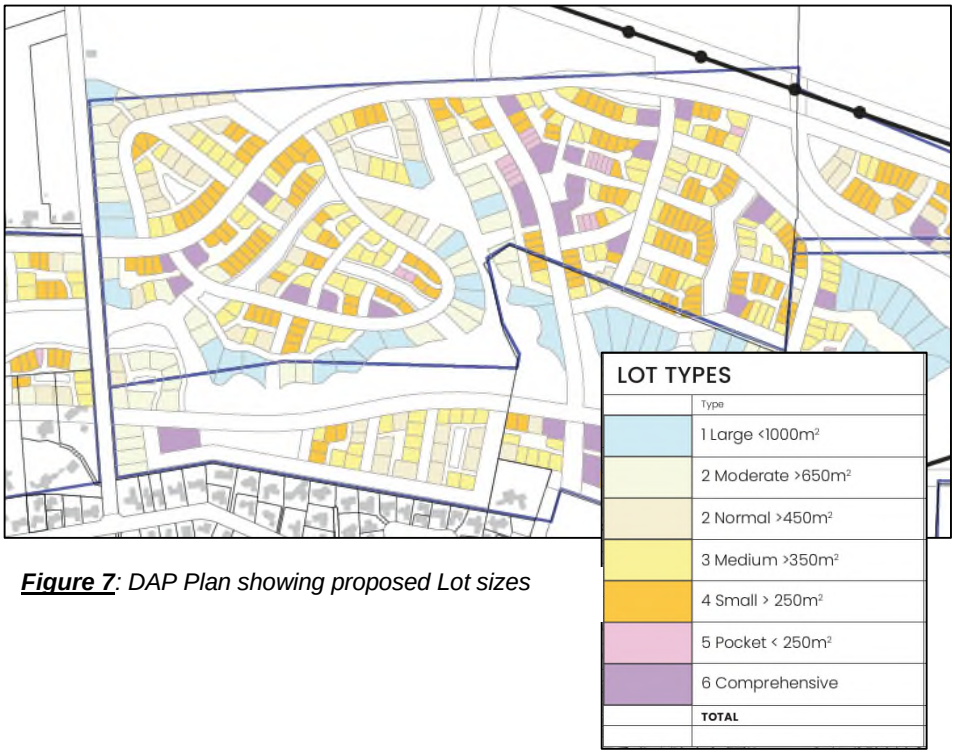

***Figure 7**: DAP Plan showing proposed Lot sizes*

b. Enhanced Accessibility and Connectivity:

- Integrating business and commercial zones within or adjacent to residential areas in FDA1 and FDA4 could also create mixed-use environments that reduce reliance on private vehicles and promote walking, cycling, and public transport use.
- This contributes to a more accessible and connected urban environment, aligning with the NPS-UD's emphasis on efficient transportation networks and walkable neighborhoods. Subsequently in comparison, FDAs 1, 2 and 4 are better located to these networks and Timaru's existing urban environment than FDAs located in the Washdyke area.

c. Promotion of Economic Activity and Employment:

- Including business or commercial zones in FDA1 and FDA4 can support local economic activity and create employment opportunities closer to residential areas. In terms of industrial land supply, Policy 1(b) mandates local authorities to provide sufficient land that meets the varying location and site size requirements of different business sectors. Addressing industrial supply is not part of this submission, but it is worth emphasising that residential development is key to supporting people working in our district so is directly linked to these other land uses. The site is well located to achieve this efficiently, subsequently promoting the economic wellbeing of our community.
- This reduces commuting distances and supports the development of vibrant, self-sufficient communities.

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d. **Protection and Enhancement of Amenity Values:**

- Well-functioning urban environments prioritize the protection and enhancement of amenity values, including open spaces, parks, and natural features.
- Rezoning FDA1 and FDA4 should incorporate these elements to create attractive and liveable communities that enhance the quality of life for residents.

2. Alignment with Integrated Infrastructure Planning and Funding Decisions (Objective 6):

a. Sequencing of Development with Infrastructure:

- Rezoning FDA1 and FDA4 must be carefully sequenced to ensure that infrastructure (e.g., water supply, wastewater, stormwater, and transportation) is planned and funded *before* or *concurrently* with development. In this instance, as part of the DAP process, a funding model for key infrastructure can be developed including consideration of both Council funding through the LTP and recovery through FCs
- The inclusion of FDA4 improves the anticipated yield, therefore funding becomes more viable when spread over a larger number of new connections to Council's networks
- This aligns with Objective 6 by preventing premature development that could strain existing infrastructure or create environmental problems.

b. Funding Mechanisms and Developer Contributions:

- Appropriate funding mechanisms can be used to support infrastructure upgrades and new infrastructure required to serve FDA1 and FDA4 as well as providing wider public benefit beyond the site. This may involve developer contributions (financial contributions), targeted rates, or other funding sources.
- Objective 6 emphasizes the importance of transparent and equitable funding arrangements to ensure that development contributes to the cost of infrastructure provision.

c. Long-Term Planning and Investment:

- Integrate the development of FDA1 and FDA4 into the Timaru District Council's Long-Term Plan (LTP) to ensure that infrastructure needs are considered in the broader context of regional growth and investment.
- This demonstrates a commitment to Objective 6 by aligning urban development with long-term infrastructure planning and funding priorities and provides an opportunity to help mitigate existing downstream problems.

d. Stormwater Management:

- The integration of high performance and nature-based solutions into stormwater management is essential in mitigating environmental impacts and promoting sustainable urban development.

3. Addressing Potential Shortfalls and Seeking Alternative Approaches (Novo Group Memo):

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- The Novo Group memo highlights that simply providing "*sufficient development capacity*" is not enough*. Local authorities must ensure at least sufficient capacity to meet demand across various housing types / land size, locations and price points*.
- If evidence demonstrates that the PDP does not adequately accommodate these evolving needs, the Council will need to consider alternative approaches to address the shortfall.
- This response therefore emphasises the proactive assessment of diverse housing needs within the Timaru community and incorporating these considerations into rezoning decisions.
- Additional options are available for Council to consider such as the option of 'Deferred Zoning' as a means of mitigation for the remaining FDA land or portion of land being requested as a result of the amended FDA1 boundary

Rezoning FDA1 and FDA4 can contribute significantly to creating well-functioning urban environments in Timaru District. Rezoning decisions must address the *variety* of housing needs which we believe exists in our community, not just the overall quantity of dwellings. The success depends on careful planning, robust infrastructure investment, a commitment to integrating urban development with long-term infrastructure planning and funding decisions, and a *proactive assessment and accommodation of diverse housing needs* within the community (understanding local demand). A combination of live rezoning addresses an immediate need and providing for future FDAs or deferred type zoning with controls provides Council the ability to address potential shortfalls, enabling adaptability/response to address those.

This approach ensures sustainable growth that enhances the quality of life for all residents and supports the region's economic prosperity. By prioritising these considerations, the Timaru District Council can effectively balance growth and community needs.

NPS-HPL

Question 3: Urban Rezonings: *Demonstrate consideration and alignment with the requirements of the NPS-HPL* ***Clause 3.6.*** *for any submission for an urban rezoning (****GRZ*** *or* ***GIZ****) where the exemptions in 3.5(7)(b) are not applicable.*

The clients "subject land" is a mix of LUC2 and LUC3 soils. The portion of land subject to LUC2 soils runs generally parallel to Washdyke Flat Road (approximately 450-500m in width), while the rest of the site is classified as LUC3 as shown in **Figure 4** above. Both FDA1 and FDA4 overlays are located solely within the LUC3 classified soils. While there are no guarantees, at the time of writing, the Government through its "Going for Housing Growth" plan has stated its intention to remove LUC3 from the definition of highly productive land in the National Policy Statement, NPS-HPL. At this stage the submitter is investigating the NPS-HPL as it relates to FDA4, and wishes to retain the right to provide further information as part of the formal response to the final s42a report, if formal changes or direction have been provided by the Government.

There are four distinctive matters of consideration with LUC3 classified soils that are subject to assessment against NPS-HPL, as identified below:

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1. FDA1: The Plans Memorandum, prepared by Matt Bonis to the Timaru District Council, confirms that FDA1 (overlay as notified) is not considered to be Highly Productive Land under Clause 3.5(7).

2. FDA4 (overlay as notified): The Plans Memorandum confirms that FDA4 was identified in the Residential GMS2022 Review as FUZ '*when Timaru requires further residential land this is a logical extension to the town'* however no timeframe was stated in this recommendation. Therefore, it is considered FDA4 is subject to assessment under NPS-HPL if rezoned through the PTDP process.

3. FDA1 amendment (as sought by client's submission 227.1): The Plans Memorandum, confirms that the extension to overlay FDA1 (part of notified FDA4 overlay) is considered to be Highly Productive Land and may be subject to assessment under NPS-HPL when rezoned.

4. FDA4 amendment (as sought by client's submission 227.1): The Plans Memorandum, confirms that the land subject to the change in boundary for FDA4 overlay is considered to be Highly Productive Land and may be subject to assessment under NPS-HPL when rezoned.

Therefore, only FDA4 and any proposed amendments sought by the submission (Points 2-4 above) are required to be considered against the requirements of NPS-HPL. As our client's submission seeks immediate rezoning of FDA1, and an extension to FDA1 is also sought, we have approached Agribusiness Group to obtain an assessment under Clause 3.6 (4) and (5) of the NPS-HPL to support the submission*. NPS-HPL Clause 3.6 requires:

> *(4) Territorial authorities that are not Tier 1 or 2 may allow urban rezoning of highly productive land only if:*
>
> *(a) the urban zoning is required to provide sufficient development capacity to meet expected demand for housing or business land in the district; and*
>
> *(b) there are no other reasonably practicable and feasible options for providing the required development capacity; and*
>
> *(c) the environmental, social, cultural and economic benefits of rezoning outweigh the environmental, social, cultural and economic costs associated with the loss of highly productive land for land-based primary production, taking into account both tangible and intangible values.*
>
> *(5) Territorial authorities must take measures to ensure that the spatial extent of any urban zone covering highly productive land is the minimum necessary to provide the required development capacity while achieving a well-functioning urban environment.*

Notably, clause 4(c) requires that 'the environmental, social, cultural and economic benefits of rezoning outweigh the long term environmental, social, cultural and economic costs associated with the loss of highly productive land for land-based primary production, taking into account both tangible and intangible values.'

The 'National Policy Statement for Highly Productive Land - Guide to Implementation' (Ministry for the Environment, 2023), expands on the requirements of the assessment defined in clause 4(c). The guide also defines the meaning of intangible values as including:

- *Its value to future generations*

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- *Its future characteristics and limited supply*
- *Its ability to support community resilience*
- *The limited ability of other land to produce certain products*

As noted in our submission, the proposed minor change to FDA1 is to allow for strategic and logical development of the area by including Taitarakihi Creek, along with its margins, within FDA1. This will enable better integration of the Creek into the development to appropriately address the esplanade, public access and Wai Taoka Lines, natural character and riparian margins, as well matters relating to stormwater management and the Flood Assessment Overlay. The change also better aligns with the northern boundary of FDA2 on the west side of Kellands Hill which will provide for a more coordinated approach to development and servicing within the subject catchments.

The area of the site within FDA4 was identified in the Planz Review of the Growth Management Strategy 2022 (GMS 2022) as suitable for future residential development. As our client seeks to amend the timeframe associated with FDA4 from "Beyond 10 years" to "less than 10 years", no rezoning is currently being sought through the PTDP process. While NPS-HPL is a relevant planning consideration, it is not a requirement to be satisfied in order to enable the change to the FDA overlays as sought by our clients.

* Due to timing, we are unable to provide any supporting assessments in relation to NPS-HPL. We are happy to provide our third-party reports as received, if required.

Question 4: Rural Lifestyle Rezonings: *Demonstrate consideration and alignment with the requirements of the NPS-HPL* ***Clauses 3.7*** *and* ***3.10*** *for any submission that requests a Rural Lifestyle rezoning (****RLZ****) where the exemptions in Clause 3.5(7)(b) are not applicable.*

Not applicable.

Canterbury Regional Policy Statement

Question 5: Growth Rezonings / Amendments to SCHED-15*: Does the proposal, either individually or in combination with those areas identified in the PDP concentrate and promote a coordinated pattern of development (referencing capacity provided in* ***Section 8*** *of this report).*

DAVIS OGILVIE
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As mentioned above, the site has already been identified as being suitable for development and is an acknowledged priority site for residential growth, hence its inclusion in the FDA overlay. The zoning is considered appropriate for the area given the proximity to established residential zoned areas, as well as FDA 2 and further west, FDA10. Council have already made significant progress in preparing a DAP and have provided a concept development plan to show an indicative development layout of the site as shown by **Figure 9** below.

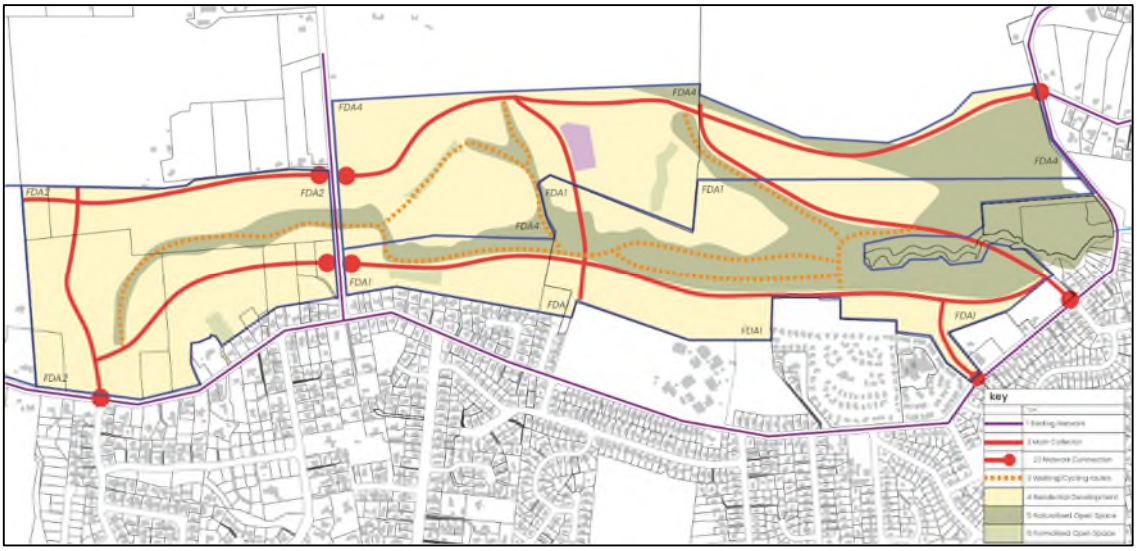

***Figure 9**: Council initiated Development Area Plan of FDA 1, FDA 2 and FDA 4*

The subject site is located within an area of Timaru that is well serviced by roads and infrastructure, and has historically been popular with lifestyle development. In regards to FDA1 (in its entirety), the GMS 2022 review states that *"At 12 HH/ha, the site could yield up to 444 HH over the life of the Plan."* We have reviewed this yield based on the DAP information received, as outlined above under Question 2.

***Question 6: Energy efficiency:** Does the proposal assist in maintaining an urban form that shortens trip distances.*

The subject site has the potential to connect to local roading along Kellands Hill Road. Any residential development at the site will require a new road to be established to allow for vehicular access to all sites. This roading will be designed to efficiently move residents from the new development to the existing road network as required (including pedestrian and bike access). Council's DAP includes a movement network that indicates how this may work, refer to **Figure 10** below.

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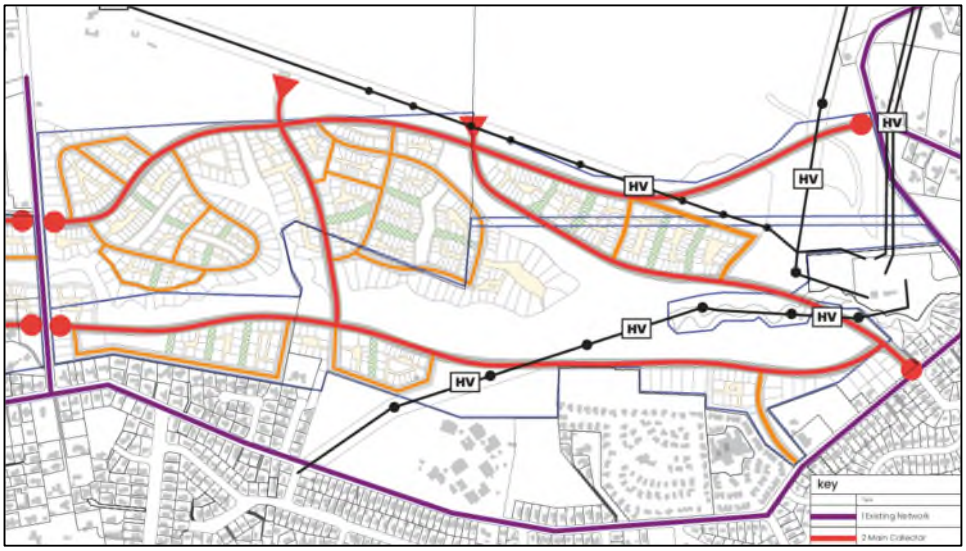

***Figure 10**: Timaru Draft ODP: Movement Network*

As the subject site has road frontage to both Kellands Hill Road and Washdyke Flat Road there is an opportunity through the PTDP process to consider Council's wider roading network requirements including any desired road widening or safety upgrades.

***Question 7: Natural Hazards:** Is the subject site associated with the submission free from inappropriate risk from a natural hazard event, if not what is the appropriate management response – including avoidance.*

FDA 1 and 4 are subject to a "Flood Assessment Area" overlay under the Proposed Timaru District Plan for Taitarakihi Creek. **Procerto's Infrastructure Report** (**Appendix 2)** references a report from WSP, being "Te Ahi Tarakihi Growth Assessment – Stormwater and Flood Risk" dated 15 March 2024 however we have not had the opportunity to review this WSP report. We note Procerto's Infrastructure Report does reference the need for dams to hold water within the Creek in FDA1. We note the DAP "GreenBlue Network" shows significant reserve areas along Taitarakihi Creek, which are anticipated to accommodate retention dams, as shown in **Figure 11** below.

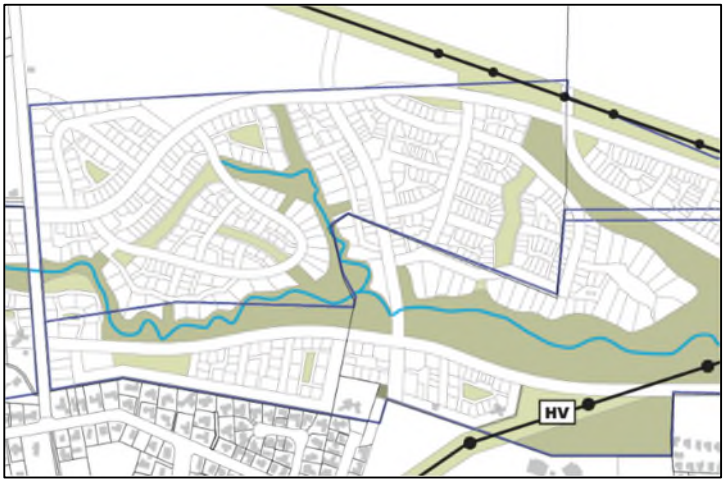

***Figure 11**: Timaru Draft ODP: GreenBlue Network*

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A geotechnical assessment was undertaken as part of Councils Development Area Plan which include the subject FDA 1 and FDA4 areas. This report concluded that "*The site can be developed through industry standard practices found in the Canterbury Region. Specific geotechnical assessment will be required as the development area is subdivided and developed."*

Overall, the assessments above concludes that the site is not subject to inappropriate risk from natural hazards, and is suitable for residential development, subject to appropriate site testing and detailed design.

Proposed District Plan

Question 8: Proposed District Plan: *Does the urban growth / rural lifestyle development (and or sequencing) contribute to a consolidated and integrated settlement pattern, achieve a coordinated pattern of development and is capable of integrating with the efficient use of infrastructure?*

FDA1 is located on the immediate northern fringe of the existing Timaru township, with lifestyle development to the west of Kellands Hill Road and Mountainview High School located further to the east. Immediately south of the site is residential activity. The development of FDA1 will result in a consolidated and co-ordinated urban form, given the subject site's location in relation to existing the urban area and established services. The site is unfragmented and held in one "ownership" which contributes to efficient development patterns.

Procerto's Infrastructure Report (**Appendix 2)**, covers matters of infrastructure servicing in more detail.

Question 9: Growth Rezonings / Amendments to SCHED-15: *Given the updated residential capacity projections in Attachment A, how does the proposal, either individually or in combination with those areas identified in the PDP, concentrate and promote a coordinated pattern of development. How is the rezoning sought (or change in FDA sequencing) required to ensure 'sufficient development capacity'?*

The subject site has already been identified as appropriate for residential development by strategic planning documents, and is identified by FDA areas 1 and 4. The change in FDA sequencing to "immediate" for FDA 1 and less than 10 years for FDA4 will not inhibit 'sufficient development capacity', but will instead allow the initial stages of development to commence in a timely manner and allow for future FDA areas to be "infrastructure ready".

Given that FDA1 is required to bring infrastructure through to supplementary FDA areas further west, it stands that this would be the first FDA to be developed (if all FDA areas are developed in sequence in terms of priority), and any amendment to the FDA1 boundary will be not only negligible but essential to ensure appropriate servicing is established for other FDA areas. FDA 4 will allow for an ongoing and coordinated approach to development that is not out of keeping with existing urban development in the area, and connects to FDA1 to the south and the east.

For General Industrial Zone

Question 10: Growth Rezonings / Amendments to SCHED-15: *Given the Industrial land capacity projections, how does the proposal, either individually or in combination with those areas identified in the*

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PDP, concentrate and promote a coordinated pattern of development. How is the rezoning sought (or change in FDA sequencing) required to ensure 'sufficient development capacity'?

Not applicable

Infrastructure and integration with land use

In regards to Questions 11, 12 and 14, please refer to **Appendix 2** for the **Draft Infrastructure Report** prepared by Procerto Group Ltd for Council, dated 26 April 2024. This report outlines potential servicing options for FDA 1, 2, and 4, demonstrating how these areas can be serviced from the Council network.

For further details on the required infrastructure upgrades under high growth scenarios, please refer to **Appendix 5** for the **WSP Water and Wastewater Growth Capacity Assessment Report**.

Question 11: Service Provision: *Identify (in conjunction with the requirements of* ***Attachment B****) how the future servicing needs of the area and the provision of adequate, coordinated and integrated infrastructure to serve those needs, including how using water sensitive design to manage stormwater will be undertaken.*

The **draft Infrastructure Report** prepared by Procerto Group Ltd **(Appendix 2)** demonstrates how FDA 1, 2 and 4 can be serviced from the Council networks.

The draft report highlights servicing within the FDA areas as well as the impact of the proposed growth on the existing network, taking into account the WSP reports which recommends necessary upgrades to Council's reticulation system to support the proposed **FDAs**. The specific required upgrades have been identified in the WSP Growth Capacity Assessment for Water and Wastewater Report. To facilitate these improvements, the upgrades must be incorporated into the Council's Long-Term Plan (LTP) to trigger the necessary upgrades.

Financial Contributions or a similar funding mechanism will need to be established to enable the growth of the proposed FDAs and Council to recover proportionate costs.

Question 12: Infrastructure integration: *Identify whether the rezoning if not required for 'sufficient development capacity' would result in wider issues for the district in terms of integration with infrastructure planning and funding decisions, or where for Rural Lifestyle Rezoning has consequences for overall yield / density and servicing requirements.*

The subject site has already been identified as appropriate for residential development and is identified by FDA areas 1 and 4. The change in FDA sequencing to "immediate" for FDA 1 and less than 10 years for FDA4 will not inhibit 'sufficient development capacity', but will instead allow the initial stages of development to commence in a coordinated manner. It is important to consider that infrastructure needs to traverse the subject site to enable further development of upstream FDA catchment areas, therefore this site plays a vital role in achieving overall infrastructure integration. This not only benefits new greenfields development areas but can provide resilience and supply to the existing urban environment.

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Amending the proposed FDA1 & 4 boundary not only makes sense to better align with site topography, but is critical to ensure that integrated infrastructure can traverse through the site with enough new development yield to make it feasible to do so, subsequently unlocking development opportunity for upstream catchment FDA areas (i.e. capturing all land needed for stormwater reserves and trunk infrastructure within the greenspace reserves). Said another way; the meaningful development of FDA2 is largely contingent on FDA1 being completed.

Transport

Question 14: Transport network integration: *Demonstrate with reference to suitable standards and the potential yield / density of development – the safe and efficient functioning of the supporting transport network, ability to facilitate modal choice, and consolidating an accessible urban form.*

As part of preparing the Development Area Plan (DAP), **Abley** have completed a draft Integrated Transport Assessment (ITA) for FDA 1, 2 and 4. The draft DAP **(Appendix 3)** shows road and public space connectivity, providing for a variety of modal choice. Of note, the draft Abley ITA states in the Executive Summary that:

In terms of the proposed transport network for the Site, we consider that:
-The proposed connections to the existing transport can operate safety, subject to further design and assessment as part of future resource consent applications.

-The internal transport network can provide for walking and cycling modes, and is future proofed for fixed public transport routes.
This will subject to further design and assessment as part of future resource consent applications.

Question 13: Hazards*: Demonstrate with reference to suitable standards, the avoidance and / or management of inappropriate natural hazard risk, and suitable geotechnical conditions.*

As mentioned in Question 7 above, the site is subject to the flood assessment area overlay (which in the case of FDA1 and 4 typically are located along gully inverts). This flooding risk is anticipated to be managed through the proposed natural hazards provisions in the PDP, and can be dealt with at the time of subdivision consent is sought.

Procerto's Infrastructure Report **(Appendix 2)** identifies that stormwater control/management will be required to minimise flood risk hazards on downstream properties, including flooding of roading in extreme events. Mitigation is currently proposed by the use of stormwater retention dams located within FDA1.

Any stormwater design, stormwater discharge and management of flood flows will be subject to consent approval from ECAN and/or Timaru District Council.

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Environmental values

Question 15: Existing Environment and characteristics: *Identify the following as relevant to the submission:*
(a) The existing lawfully established land use(s) as they relate to the area that is subject to the submission, including: density (and existing fragmentation of sites), amenity and character, and range of uses.
(b) Geophysical boundaries that would distinguish zone boundaries, including how the proposal would result in the contiguity of existing urban areas (proximity and agglomeration of existing urban areas).
(c) Existing resource consents that provide for established land uses, including alignment with the anticipated outcomes associated with the submission.

The site is predominantly in pasture and run as a sheep farm in one holding. The woolshed, sheepyards, farm yard and dwelling are all located adjacent to Kellands Hill Road. The site is intersected by multiple waterways (Washdyke Creek and Oakwood Stream to the North and Taitarakihi Creek to the south). As outlined in the original submission the FDA boundaries sought were aimed at aligning to natural features present on the site; e.g. fences, hedges, property boundaries, while considering the natural gullies (future stormwater/reserve areas) and how best to develop the site with this in mind.

Question 16: Environmental Values: *Where the site incorporates or adjoins any of the following as notated within the PDP:*
(a) Specific values associated with Landscape values and natural character.
(b) Biodiversity constraints.
(c) Cultural and / or Heritage values.
(d) Existing or permitted Intensive Farming Activities, Rural Industry or other established Rural that could generate incompatible land uses with the submission outcome.

The site is not located within an area of natural significance, biodiversity overlay, or is identified for cultural or heritage values (outside of noted overlays). These matters do not constrain the site nor are there any incompatible use matters that would arise as a result of altering the sequencing and timing of the FDA requirement.

Submitters shall provide information as to whether any additional standards, rules or methods (other than those already contained within the respective zone standards) are required to maintain or enhance any specific attribute, value or effects. This shall include where specific features or attributes should be retained through subsequent subdivision, use or development.

No specific additional standards, rules, or methods have been considered as part of this additional report memo, however, it is acknowledged that it may be appropriate to generate site specific rules and methods such as the provision of Council's outline development plan to ensure that future development proceeds in a prescribed manner, providing certainty for both Council and the community.

Specific matters

Question 17: Submitters shall provide information and analysis on the specific matters identified, noting that

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these may well overlap with Questions 1 – 16 above.

All of the relevant specific matters and information requirements have been included in earlier sections of this report memo.

[illegible]

The submitter supports the Proposed Timaru District Plan (PTDP) and the designation of their site for future residential development. However, they request an expedited rezoning process to allow for immediate development, citing completed concept plans and technical investigations. This memo highlights the need for adjustments to Future Development Areas (FDA) 1 and 4 to better align with site characteristics, infrastructure planning, and natural features.

Key planning frameworks, including the National Policy Statement on Urban Development (NPS-UD) and the National Policy Statement on Highly Productive Land (NPS-HPL) have been considered. It is concluded that rezoning FDA1 and FDA4 will contribute to; a well-functioning urban environment, enhance housing diversity, and integrate with infrastructure planning while ensuring sustainable growth. Concerns over yield assumptions in the Property Economics analysis are raised, suggesting a more localised approach is needed to accurately project development capacity.

Infrastructure and environmental considerations, including stormwater management, transport connectivity, and hazard mitigation, have been addressed through technical assessments. The submitter argues that delaying development could increase costs and reduce housing options, and therefore, immediate rezoning without FDA constraints is recommended to facilitate efficient and cost-effective urban expansion.

Disclaimer: The above is intended to provide the preliminary s.42A author with some further information in regards to the suitability of the site for development. The submitter retains their right to provide further information in response to the s42A report and is not bound by the information provided to date.

[illegible]

- Appendix 1 – Table 1 Checklist for Submitters
- Appendix 2 – Procerto Infrastructure Report
- Appendix 3 – Timaru District Council Draft ODP
- Appendix 4 – Novo Group Memo on NPS-UD
- Appendix 5 – WSP Water and Wastewater Growth Capacity Assessment Report

Table 1 Checklist for Submitters

Table 1: Checklist for Submitters

Consideration	Question (Sections 7 – 11)		Check
'Give effect to' **NPS-UD** (Section 7)	Question 1:	What is the contribution of the rezoning (or amendment in timing associated with SCHED-15 (FDAs)) in terms of the provision (residential / rural lifestyle – yield, density; and business- area) in relation to the Council's provision of 'at least' sufficient development capacity (**Policy 2**) given the Property Economics analysis (**Section 8**)?	☐
	Question 2:	For residential and business rezonings how would the rezoning (or amendment in timing associated with SCHED-15 (FDAs)) contribute to 'well-functioning urban environments' (**Objective 1** and **Policy 1**) and align with responsibilities of the Timaru District Council to ensure decisions on urban development that affect urban environments are integrated with infrastructure planning and funding decisions (**Objective 6**)?	☐
'Give effect to' **NPS-HPL** (Section 7)	Question 3:	**Urban Rezonings:** Demonstrate consideration and alignment with the requirements of the NPS-HPL **Clause 3.6.** for any submission for an urban rezoning (**GRZ** or **GIZ**) where the exemptions in 3.5(7)(b) are not applicable.	☐
	Question 4:	**Rural Lifestyle Rezonings:** Demonstrate consideration and alignment with the requirements of the NPS-HPL **Clauses 3.7** and **3.10** for any submission that requests a Rural Lifestyle rezoning (**RLZ**) where the exemptions in Clause 3.5(7)(b) are not applicable.	☐
'Give effect to' **Canterbury Regional Policy Statement** (Section 7)	Question 5:	**Growth Rezonings / Amendments to SCHED-15**: Does the proposal, either individually or in combination with those areas identified in the PDP concentrate and promote a coordinated pattern of development (referencing capacity provided in **Section 8** of this report).	☐
	Question 6:	**Energy efficiency:** Does the proposal assist in maintaining an urban form that shortens trip distances.	☐
	Question 7:	**Natural Hazards:** Is the subject site associated with the submission free from inappropriate risk from a natural hazard event, if not what is the appropriate management response – including avoidance.	☐
'achieve and implement' **Proposed District Plan** (Section 7)	Question 8:	**Proposed District Plan:** Does the urban growth / rural lifestyle development (and or sequencing) contribute to a consolidated and integrated settlement pattern, achieve a coordinated pattern of development and is capable of integrating with the efficient use of infrastructure?	☐
For Residential / Rural Lifestyle submitters (Section 8)	Question 9:	**Growth Rezonings / Amendments to SCHED-15:** Given the updated residential capacity projections in **Attachment A**, how does the proposal, either individually or in combination with those areas identified in the PDP, concentrate and promote a coordinated pattern of development. How is the rezoning sought (or change in FDA sequencing) required to ensure 'sufficient development capacity'?	☐
For General Industrial Zone (Section 8)	Question 10:	**Growth Rezonings / Amendments to SCHED-15:** Given the Industrial land capacity projections, how does the proposal, either individually or in combination with those areas identified in the PDP, concentrate and promote a coordinated pattern of development. How is the rezoning sought (or change in FDA sequencing) required to ensure 'sufficient development capacity'?	☐
Infrastructure and integration with Land use	Question 11:	**Service Provision:** Identify (in conjunction with the requirements of **Attachment B**) how the future servicing needs of the area and the provision of adequate, coordinated and integrated infrastructure to serve those needs,	☐

(Section 9)		including how using water sensitive design to manage stormwater will be undertaken.	
	Question 12:	**Infrastructure integration:** Identify whether the rezoning if not required for 'sufficient development capacity' would result in wider issues for the district in terms of integration with infrastructure planning and funding decisions, or where for Rural Lifestyle Rezoning has consequences for overall yield / density and servicing requirements.	☐
	Question 13:	**Hazards:** Demonstrate with reference to suitable standards, the avoidance and / or management of inappropriate natural hazard risk, and suitable geotechnical conditions.	☐
Transport (Section 9)	Question 14:	**Transport network integration:** Demonstrate with reference to suitable standards and the potential yield / density of development – the safe and efficient functioning of the supporting transport network, ability to facilitate modal choice, and consolidating an accessible urban form.	☐
Environmental Values (Section 10)	Question 15:	**Existing Environment and characteristics:** Identify the following as relevant to the submission: (a) The existing lawfully established land use(s) as they relate to the area that is subject to the submission, including: density (and existing fragmentation of sites), amenity and character, and range of uses. (b) Geophysical boundaries that would distinguish zone boundaries, including how the proposal would result in the contiguity of existing urban areas (proximity and agglomeration of existing urban areas). (c) Existing resource consents that provide for established land uses, including alignment with the anticipated outcomes associated with the submission.	☐
	Question 16:	**Environmental Values:** Where the site incorporates or adjoins any of the following as notated within the PDP: (a) Specific values associated with Landscape values and natural character. (b) Biodiversity constraints. (c) Cultural and / or Heritage values. (d) Existing or permitted Intensive Farming Activities, Rural Industry or other established Rural that could generate incompatible land uses with the submission outcome. Submitters shall provide information as to whether any additional standards, rules or methods (other than those already contained within the respective zone standards) are required to maintain or enhance any specific attribute, value or effects. This shall include where specific features or attributes should be retained through subsequent subdivision, use or development.	☐
Specific Matters (Section 11)	Question 17:	Submitters shall provide information and analysis on the specific matters identified, noting that these may well overlap with Questions 1 – 16 above.	☐

procerto BUILDING PROJECT CERTAINTY

INFRASTRUCTURE REPORT

Future Development Area 1, 2 and 4
Timaru

Timaru District Council

26 April 2024

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PROCERTO GROUP LIMITED

TABLE OF CONTENTS

1 INTRODUCTION

Timaru District Council (TDC) is proposing to rezone a large rural land in Timaru, referred to as Future Development Areas (FDA's) 1, 2 and 4. into general residential land through the creation and consenting of a comprehensive development area plan.

Procerto Group Limited (Procerto) has been engaged to provide conceptual civil engineering support and to present options to service the project.

The purpose of this report is to summarise the existing infrastructure that is at proximity of the site and list the servicing options for the future subdivision.

2 COMPLIANCE

The civil infrastructure design will be in accordance with the TDC Infrastructure Design Standard (IDS), Timaru District Plan and future Resource Consent.

The below codes, legislations, and standards will be considered amongst others, along with professional best practices:

- Building Act 2004
- Canterbury Regional Policy Statement 2013
- Christchurch City Council – Waterways, Wetlands and Drainage Guide (CCC WWDG)
- NZS 4404 – Land Development and Subdivision Infrastructure
- New Zealand Building Code and relevant acceptable solutions and verification methods
- New Zealand Transport Agency Standards
- Resource Management Act 1991
- SNZ PAS 4509 – New Zealand Fire Service Firefighting Water Supplies – Code of Practice

3 SITE DESCRIPTION

The site is a pseudo-rectangular shaped greenfield (with minor brownfield where the 10 existing dwellings are located) with total gross area of 137ha.

Under the Timaru District Plan, it is currently zoned General Rural and part of the site is within the:

- flood assessment area (along the Te Ahi Tarakihi Creek and various gullies),
- liquefaction awareness area (close to the power substation),
- historical and cultural values – sites and areas (Wahi Tupuna and Wai Taoka Lines, along the Te Ahi Tarakihi Creek), and
- drinking water protection area (west of FDA 2).

Timaru District Council also identifies:

- an esplanade provision (along the Te Ahi Tarakihi Creek),
- a public access provision (along the Te Ahi Tarakihi Creek),
- a designated area (TPR-1 for the Timaru power substation), and
- a transitional highly productive land LUC Class 3 (whole site).

The site location is shown on Figure 1.

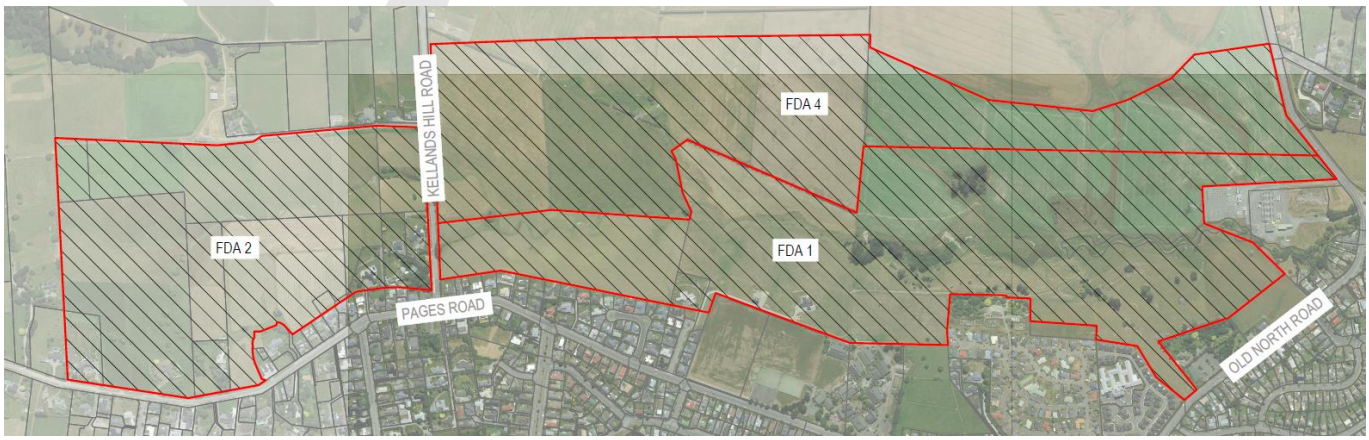

Figure 1 – Site Location

Review of the Land Information New Zealand (LINZ) indicates that the site is composed of multiples lots: Lot 1 and 2 DP 73425, Lot 3 DP 422339 (Part), Lot 2 DP 76504, Lot 1 and 2 DP 531735, Lot 1 DP 75196, Lot 1 and 3 DP 352458, Lot 1 DP 300793, Lot 4 DP 75780, Lot 1 to 3 DP 371822, Lot 2 DP 313487, Part Lot 3 DP 19552 (Part), Lot 12 DP 490931 and Lot 2 DP 472381 (Part).

The ground varies from flat to steep and is generally sloped towards the Te Ahi Tarakihi Creek. Table 1 classifies the slopes in accordance with Manaaki Whenua – Landscare Research 2020 (Our Environment – Land Atlas of New Zealand).

Table 1 – Existing ground slopes categorised as per Land Atlas of New Zealand

Minimum slope	Maximum slope	Area (%)	Classification
Flat	1:16	30%	Flat to gently undulating
1:16	1:7.5	34%	Undulating
1:7.5	1:3.5	31%	Rolling
1:3.5	1:2.5	3%	Strongly rolling
1:2.5	Vertical	1%	Moderately steep to very steep

3 STORMWATER

TDC IDS – Part 5: Stormwater and land drainage sets the minimum requirement for the design of stormwater infrastructure within the Timaru District.

The primary system will be designed to accommodate at least the 10% AEP (1 in 10-Year) storm derived from NIWA HIRDS version 4.0 with RCP 8.5 (2081-2100 climate change scenario, which assumes an increase of temperature of 2.6˚C). The secondary system (overland flow path) will be designed for at least the 2% AEP storm intensity taken from the same database. Table 2 summarises the range of rainfall intensities that will be used to design this development. The TDC IDS Part 5 appendices include rainfall intensities that are greater, however they are deemed to be invalid as it is noted that they were calculated with a manual on projections of future climate changes that has been superseded in 2016. NIWA HIRDS version 4.0 is based on the "Climate Change Projections for New Zealand" published in 2016 by the Ministry from the Environment.

Table 2 – Rainfall intensity as per NIWA HIRDS version 4.0 with RCP 8.5

AEP	Rainfall intensity (mm/h)			
	Duration			
	10min	1h	12h	24h
50%	34.5	12.7	3.37	2.25
10%	64	22.7	5.80	3.81
2%	103	35.7	8.74	5.67
0.5%	149	49.9	11.9	7.62

It is proposed that stormwater runoff will be conveyed through kerb inlets, roadside channels (kerb and channel), sumps, pipes, inspection structures, outlet structures, and water quantity and quality control structures.

Pipe sizes, gradients and depths will be selected through catchment and hydraulic grade line analysis at developed/detailed design stage.

All allotments will be provided with a lateral connection to the stormwater system. Front lots (sloping towards a road) runoff will be discharged to the kerb and channel through a kerb inlet, whilst back lots (sloping towards an open drain (e.g. Te Ahi Tarakihi Creek) runoff will be discharges directly to the Te Ahi Tarakihi Creek through stabilised outlets.

In extreme events, the stormwater runoff will pond over the road sag points until it discharges away from the road reserve to the Te Ahi Tarakihi Creek. Drawing C210 presented in Appendix 1 shows a conceptual overland flow path strategy.

The requirements to enhance the Te Ahi Tarakihi Creek capacity and/or ecological qualities are yet to be confirmed.

Discharge of this development will need to be authorised by Environment Canterbury Regional Council (ECAN). This can be achieved by conforming to a Stormwater Management Plan or by complying with the conditions of the discharge consent held by TDC. Stormwater tanks may be recommended on private properties to regulate stormwater discharge to prevent erosion and to attenuate the flood flows (to be confirmed).

3.1 STOMWATER QUANTITY

The proposed development must not accelerate, worsen, or result in material damage from natural hazard on other land. For stormwater, this means the peak runoff flow and volume at post-development stage must not be greater than in pre-development stage, i.e. stormwater neutrality must be achieved.

According to the hydrological catchment defined by ECAN in July 2018, FDA's 1, 2 and 4 are within the 549ha Te Ahi Tarakihi (Taitarakihi) Creek catchment. The catchment extent is shown on Figure 2.

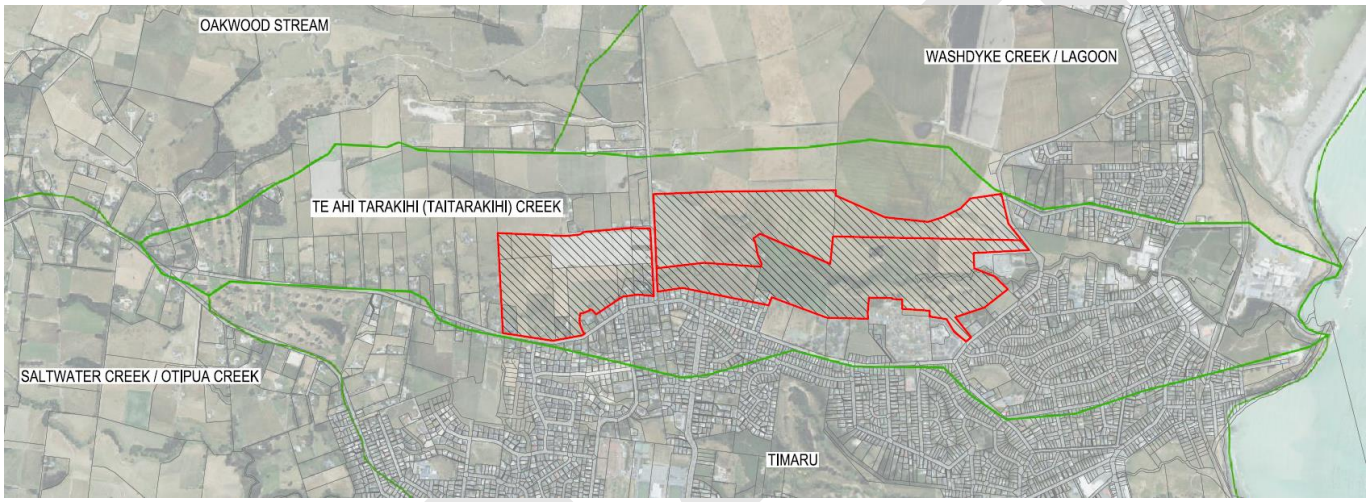

Figure 2 - Te Ahi Tarakihi Creek Stormwater Catchment

WSP "Te Ahi Tarakihi Growth Assessment – Stormwater and Flood Risk" report, dated 15 March 2024, highlights the flood issues of the Te Ahi Tarakihi Creek catchment at pre-development and post-development of FDA's 1, 2, 4 and 10, and proposes dams are constructed to hold water within the Creek in FDA 1 as a solution to resolve these. WSP recommends mitigating the 0.5% AEP storm with two classifiable dams holding up to 8.7m of water to provide up to 280,000m^3 in storage capacity, but notes that this would not be enough to eliminate any the flood risk hazard on any of the downstream properties, nor to make the state highway passable by vehicles in an extreme event. Yet, it would reduce the flood risk on the downstream properties and offset the effect of anticipated future increased rainfall. According to WSP, the critical duration for flood storage behind the bund is a 12-hour, and the critical duration for peak flows and flood depth/extent in the existing urban area is 1-hour.

Procerto was requested to determine the dam sizes required to mitigate only the FDA's 1, 2 and 4. The Rational Method has been used to conservatively determine the runoff flows. The pre-development and post-development parameters, and critical peak flows and volumes are shown in Table 3.

Table 3 – 0.5% AEP Pre-development and post-development flood peak flows and volumes

Stage	Run-off coefficient "C"	Time of concentration (min)	1-h Duration Storm Peak Flow (m^3/s)	12-h Duration Storm Volume (m^3)
Pre-development	0.30	88 | Selected: 60	6.7	69,000
Post-development	0.61	60	11.5	119,000
Difference	0.31	-	4.8	50,000

As classifiable dams could complicate the consenting requirements and increase the project cost, they should be avoided where other options exist.

The Building (Dam Safety) Regulations 2022 explains what a classifiable dam is:

- Section 5: Meaning of classifiable dam – A classifiable dam, is a dam that a) has a height of 4 or more metres and stores 20,000 or more cubic metres volume of water or other fluid, or b) has a height of 1 or more metres and stores 40,000 or more cubic metres volume of water or other fluid.
- Section 6: Height of dam – A dam's height must be measured for the purposes of regulation 5 in accordance with section 133B of the Act.
- Section 7: Stored volume of dam – The stored volume of water or other fluid does not include,— (a) in the case of a dam across a stream, water or fluid that is lower than the natural ground level at the lowest downstream outside limit of the dam; (b) in the case of a dam not across a stream, water or fluid that is lower than the natural ground level at the lowest elevation at the outside limit of the dam; (c) in the case of a canal where the canal invert is below the natural ground level, water or fluid that is lower than the natural ground level at the lowest elevation at the outside limit of the canal structure.

Section 133B of the Building Act states that "the height of a dam is the vertical distance from the crest of the dam and must be measured,— (a) in the case of a dam across a stream, from the natural bed of the stream at the lowest downstream outside limit of the dam; and (b) in the case of a dam not across a stream, from the lowest elevation at the outside limit of the dam; and (c) in the case of a canal, from the invert of the canal."

Simply put, if a dam has a height of less than 4m and store less than 40,000m^3 of water, or if it has a height of 4m or more and store less than 20,000m^3 of water, it is not classifiable.

Due to the shape of the existing ground, the height of the dam easily exceeds 4m prior any significant storage is provided, and the storage volume is generally the limiting factor to avoid classifiable dams.

Drawing C200 presented in Appendix 2 shows conceptual options for storing stormwater.

Below are the options to reduce the dam heights, if required:

- Increase the number of dams (could also provide more storage),
- Modify the stream bed cross-section so that it allows for more storage at lower elevation, and/or
- Reduce the mitigation requirement by:
    - Registering a consent notice under the Resource Management Act 1991 Section 221 on each titles stating that on-site attenuation (i.e. storage tank(s)) is required,
    - Solely mitigating FDA's 1, 2 and 4 (not the existing issues downstream),
    - Mitigating the 1% AEP rainfall event rather than the 0.5% AEP, and/or
    - Recalculating the required storage volume with a dynamic analysis (flood model) made through a modelling software, as the Rational Method tends to give conservative results for hill catchments bigger than 5ha.

Sizing of the culverts crossing the dams will be made at developed/detailed design stage in consideration to the confirmed mitigation requirement, scheme plan, modified stream bed (if any), dams height and New Zealand Fish Passage Guidelines (if applicable).

Stability of the ground in consideration of the temporary water detention should be confirmed by a geotechnical engineer.

3.2 STOMWATER QUALITY

Water quality is generally achieved with a combination of swales, rain gardens, dry basin, wet pond, gross pollutant trap and/or proprietary system.

Whilst roof and landscaping areas do not need pre-treatment if discharged directly to the Te Ahi Tarakihi Creek, all runoff that enters the stormwater inlets (sumps) is deemed to be contaminated and must be treated.

The minimum target contaminant removal rates in Timaru for non-residential activity (including roads) having an area exceeding 30m^2 in the Residential zone are shown in Table 4. Treatment will be provided for the first flush rainfall (10mm/h or 21mm depth).

Table 4 - Minimum target contaminant removal rates (Residential zone)

First Flush	TSS	Zinc	Copper	Petroleum Hydrocarbons	Nutrients (Nitrogen, Phosphorus)
10mm/h | 21mm depth	80%	70%	70%	70%	50%

All sumps will be constructed with sediment trap and submerged outlet to TDC CSS SD5302, whilst noting that side entry sump may be required in a few places. The sediment trap will collect heavy contaminants at source and the submerged outlet will prevent floatable solids and hydrocarbons from entering the drains.

Dams constructed for stormwater quantity also act as dry ponds or wet ponds (depending on if dead storage is provided or not. If space allows (to be confirmed), a wetland could be constructed downstream of the development, close to the power substation and a forebay, to treat most of the contaminants. Nonetheless, as it would be preferable and could likely be required to pre-treat the runoff prior to discharge in the Te Ahi Tarakihi Creek, proprietary device would likely be required upstream of all outfalls discharging to the Creek which contain runoff generated from the road catchments.

The final selection of stormwater quality devices will be made at developed/detailed design stage.

4 WASTEWATER

TDC IDS – Part 6: Wastewater Drainage sets the minimum requirement for the design of stormwater infrastructure within the Timaru District.

WSP "Timaru and Temuka Growth Capacity Assessment – Wastewater" report, dated 10 November 2023, highlights the upgrades that would be required on council's wastewater network to service FDA's 1, 2 and 4. The following parameters has been used for Timaru:

- General residential zone density of 12 lots per hectare (unless specific lot numbers were available)
- Medium density residential zone density of 18 lots per hectare
- Rural lifestyle zone density of 2 lots per hectare with all lot connected to the reticulated network
- Average residential occupancy of 2.3 persons per lot

Table 5 shows the forecasted population and proposed discharged points for FDA's 1, 2 and 4 as determined by WSP.

Table 5 – Forecasted population and proposed discharged points for FDA's 1, 2 and 4 (WSP)

Identifier	Area (ha)	Assumed Max Lots	Modelled population	Modelled discharged point
FDA 1	49.8	598	1,374	OLDN-MH02421
FDA 2	36.7	440	1,013	PAGE-MH03250
FDA 4	45.2	542	1,248	JELL-MH02559
FDA 1, 2 and 4	132	1,580	3,635	-

TDC IDS specifies the below parameters for the design of wastewater infrastructure:

- General residential zone net density (calculated with the net development area which includes roads but excludes reserves) of 15 lots per hectare
- Medium density residential zone net density of 30 lots per hectare
- Rural lifestyle zone net density of 2 lots per hectare with all lot connected to the reticulated network
- Average residential occupancy of 2.7 persons per lot

As there is no minimum reserve area defined in the district plan and standards, Common Ground Southern (CGS) latest block layout including road network, development area and green network, dated 9 April 2024, shown on Figure 3, is used to determine the net development area. Table 6 shows the estimated maximum population for FDA's 1, 2 and 4 assuming the maximum net density of 15 lots per hectare is achieved and using the average residential occupancy of 2.7 persons per lot.

The upgrade solution proposed by WSP is shown on Figure 4. Procerto recommends that updates for this solution, to allow for the maximum population density that could be developed within the district, and alternative discharge point options, are sought. Based on their current model, only FDA 4 could be serviced prior to any upgrade of the existing infrastructure.

Pipes will be sized using the following parameters:

- Peaking factor of 2.5 for the dry weather flow (peak/average ratio)
- Peaking factor of 2.0 for the wet weather flow (storm peaking factor)
- Average residential flows derived from a water use of 220 litres per person per day.

It is currently assumed that the development density will not exceed 15 households/ha and that any commercial areas, if any, will be under Local Centre zoning. Because LRZ has a lower flow per hectare than GRZ, it is conservative at adequate at this stage to determine the flows considering the whole development will be GRZ.

Table 6 – Estimated maximum population for FDA's 1, 2 and 4

Identifier	Net Area (ha)	Estimated maximum lots	Estimated maximum population	Difference between estimated and modelled population
FDA 1	34.5	518	1,399	25 (2%)
FDA 2	32.6	489	1,321	308 (30%)
FDA 4	34.1	513	1,386	138 (11%)
FDA 1, 2 and 4	101	1,520	4,106	471 (13%)

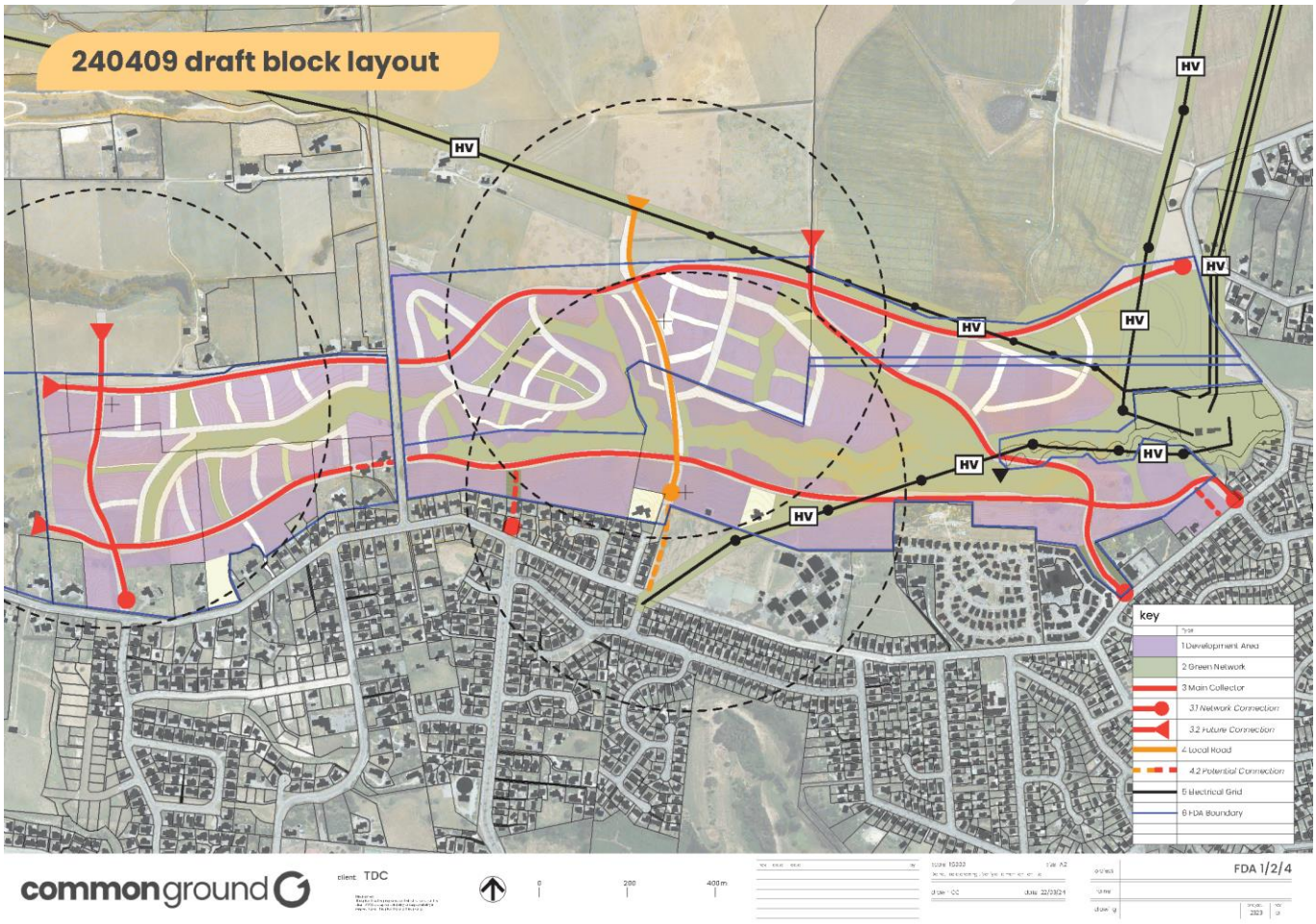

Figure 3 - Preliminary block layout (Common Ground Southern)

The wastewater system for FDA's 1, 2 and 4 could be made of:

- Gravity network(s) with pumpstations, and/or
- Low pressure system(s), including a boundary kit, a pump, a storage chamber, and a controller (e.g. IOTA Onebox) on each lot.

Drawing C300 presented in Appendix 3 shows a concept layout for a gravity system with pumpstations made on a previous version of CGS block layout dated 22 March 2024. The design was done to visualise how the network could look if the existing ground levels are followed as much as possible and deep excavations are avoided and to show the maximum of pumpstations the development could require. It has been found that up to 11 pumpstations could be required, whilst noting that this could greatly be optimised based on multiple variables such as how much earthworks are doable, council acceptance on mains crossing reserves, how deep the pipes are tolerated to be in the Timaru District (for comparison, CCC generally accepts mains as deep as 5m, but collectors are required where the main is deeper than 2.5m).

Low pressure system(s) may be more suitable for at least part of this development because:

- less earthworks would be required,

- the geotechnical investigation report identifies that rock is present in certain location at only 2m from the existing ground surface (exact location and depth yet to be confirmed through a depth to rock map),
- gravity system would require deep pipes and manholes,
- numerous network pumpstations could be required,
- pipes and manholes located on relatively steep terrain along the back boundary of certain lots would be difficult and expensive to install and maintain, and would require easements in favour to council, and thus,
- a 25-year net present value assessment would likely return a lower cost figure for low pressure system than for a gravity system.

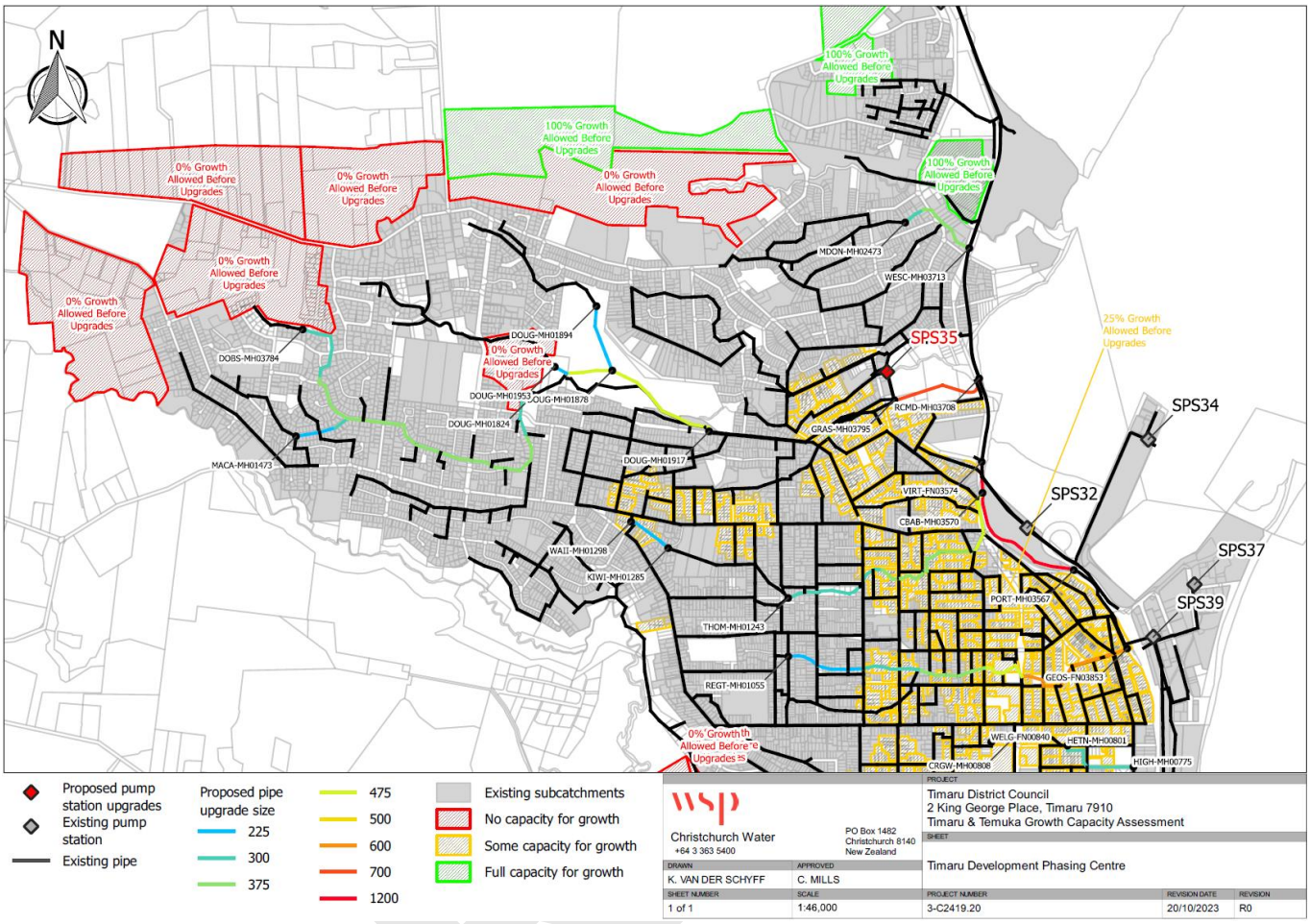

Figure 4 – Wastewater upgrades required to service the FDA's 1, 2 and 4 (WSP)

All allotments will be provided with a lateral connection to the reticulated wastewater network.

5 WATER SUPPLY

TDC IDS – Part 7: Water Supply sets the minimum requirement for the design of stormwater infrastructure within the Timaru District.

WSP "Timaru and Temuka Growth Capacity Assessment – Water" report, dated 18 December 2023, highlights the impacts of the proposed city growth on the existing network and recommend upgrades that would be required on council's reticulation to cater the FDA's. The following parameters has been used for Timaru:

- Residential peak day demand is 970L/connection/d,
- Diurnal peak factor is 2.3,
- Leakage rate of 150L/connection/d (assumed to occur at all new residential connections), and
- Peak demand including leakage is 0.0275 L/s/connection.

Table 7 shows the forecasted peak demand for FDA's 1, 2 and 4 as determined by WSP.

The existing network must be upgraded to cater for the increased demand. For FDA 1 and 4, the existing DN300 CI main on Morgans Road needs to be upgraded to a DN500 PE100 PN12.5 (±1.5km), whilst noting that up to 200 lots could progress in advance of the upgrade if required (to be confirmed in developed/detailed design stage). For FDA 2, a detailed assessment of Gleniti zone and upgrade to Gleniti pumpstation are required.

The preliminary main layout and sizing as proposed by WSP is shown on Figure 5. It is likely that DN200 mains will be proposed along the collectors and DN150 in the other roads, subject to remodel of the reticulation, which could be done at developed/detailed design after a scheme plan is proposed.

All allotments will be provided with a lateral connection to the reticulated water supply system.

Table 7 – Forecasted peak demand for FDA's 1, 2 and 4 as determined by WSP

Identifier	Assumed Max Lots	Average PDD (L/s)	Peak Demand incl. leakage (L/s)
FDA 1	598	6.7	16.5
FDA 2	440	4.9	12.1
FDA 4	542	6.1	14.9
FDA 1, 2 and 4	1,580	17.7	43.5

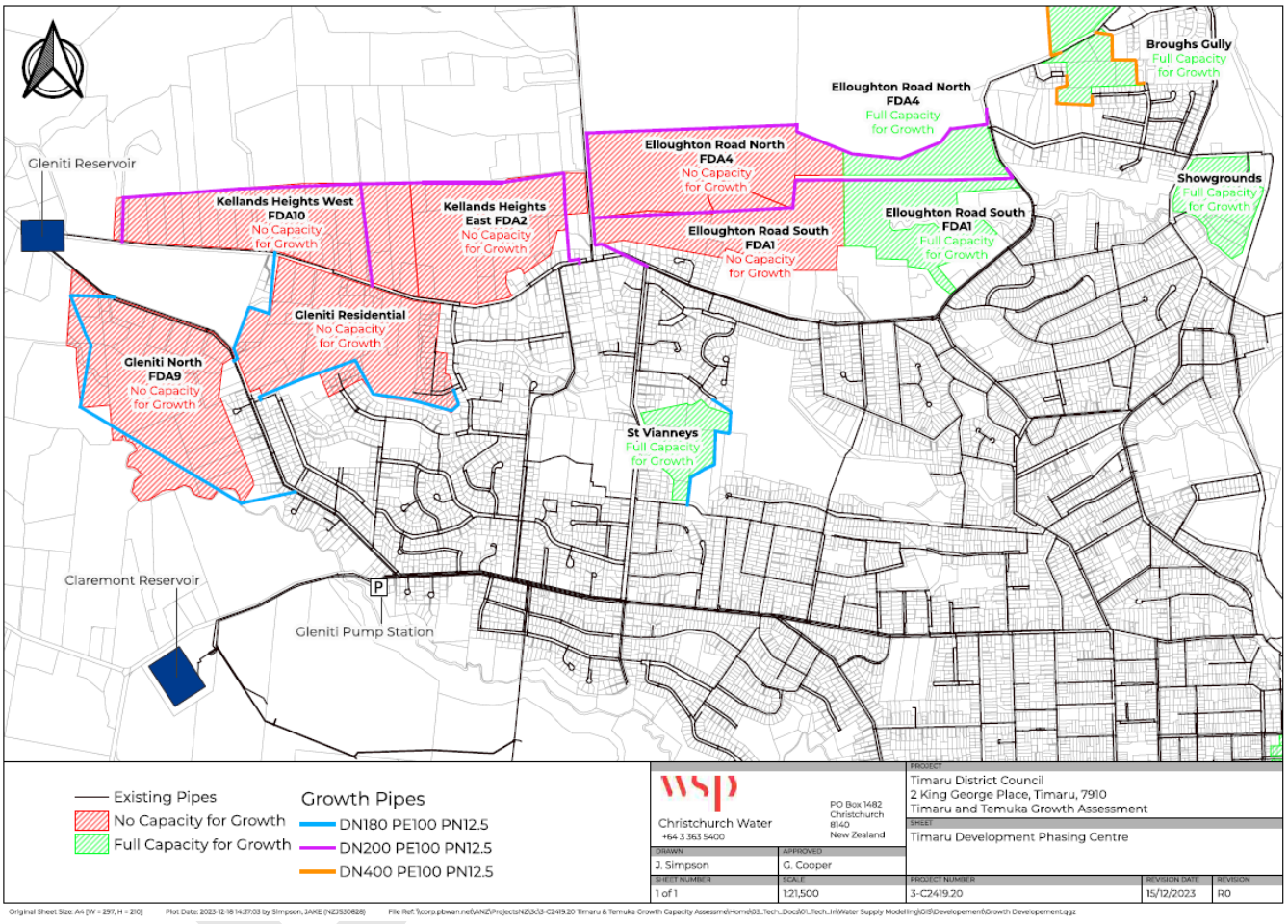

Figure 5 - Preliminary water main layout and sizing (WSP)

6 ROADING AND GRADING

The proposed development will comprise of four collector roads, and multiple local roads and rights-of-way.

Table 8 presents the road design requirements as per the Timaru District Plan.

As roads will be constructed on slopes, the ability to provide all the required elements of a streetscape is affected and it could be difficult to achieve the minimum widths for some or all of those elements. If required:

- some of the road legal width could be reduced (subject to council approval),
- localised widening to construct passing or parking bays or to accommodate heavy vehicles could be provided,
- standard of elements could be compromised through restricted parking, construction only one footpath or combining elements (e.g. shared cycle paths and footpaths),

- stabilised batter or retaining wall could be constructed, and/or
- cycle facilities could be provided separately from the carriageway.

For concept design, the current proposed layout is likely of sufficient quality and definition, and it is only at developed/detailed design stage that aesthetic, breaking, visibility and intersection design parameters and requirements will be considered, and optimisation will be made.

Table 8 – Road design requirements

Road classification	Collector	Local
Minimum road reserve width (m)	22	20
Traffic lane (minimum)	2 x 3.0m	2 x 3.0m
Shoulder (minimum)	N/A	N/A
Parking (minimum)	2.0m on both sides	2.0m on both sides
Cycle lane (minimum)	1.8m on both sides	Optional, 1.8m if provided
Minimum sealed carriageway width (m)	13.6	10.0
Footpath requirement (minimum)	1.8m on both sides	1.8m on both sides
Utility / Amenity strip requirement (minimum)	1.0m on both sides	1.0m on both sides

The target maximum slope should be 1:3 for front lots and 1:5 for back lots, to avoid the need for high retaining wall and difficult access (e.g. switchbacks). Smoother grades are desirable, but they come at a higher cost.

7 UTILITIES

7.1 POWER

There are multiple power assets on site, including overhead high-voltage powerlines of up to 220kV held by poles or pylons owned by either Alpine Energy or Transpower, and underground high-voltage powerlines owned by Alpine Energy.

The overhead high-voltage powerlines more than 66kV should remain unchanged as it is not practical to underground them, and it would be very expensive to relocate them. The overhead high-voltage powerlines not exceeding 66kV should be undergrounded and located away from the Te Ahi Tarakihi Creek.

Alpine Energy power network will be extended to service the development with a reliable supply.

7.2 TELECOMMUNICATION

Based on the Chorus Broadband availability map, Fibre is available in Timaru. It is anticipated that the Fibre network will be extended to service the FDA's 1, 2 and 4.

8 EARTHWORKS

Review of ECAN's Listed Land Use Register has shown that this site is on the Hazardous Activities and Industries List (HAIL). The listed HAIL activities are: A8 – Livestock dip or spray race operations (on most of the future developments areas 1, 2 and 4) and F4 – Motor vehicle workshops (81 Kellands Hill Road). Soil sampling and analysis will be required to confirm this. The hazardous soil (if any) would need to be removed from the site.

According to ECAN, there are no aquifer below the proposed development.

As per ENGEO "Geotechnical Investigation to Support Plan Change – Marchwiel, Timaru" draft report, dated 8 March 2024:

- "The recorded ground water from the NZGD investigation shows the groundwater is typically > 3 m deep", but seepage was observed in two tests pits at 2.5m and 2.8m depth.
- The site is characterized as "rock or hill soils" where liquefaction damage is unlikely (equivalent to very low liquefaction vulnerability based on the categories defined in Ministry for the Environment (2017). However, "should bulk earthworks form areas of sloped land (such as adjacent to water courses, water storage or stormwater basins), then detailed design will need to appropriately manage the risk for the

possibility of lateral spread and could include the need to install retaining walls depending on slope steepness and the proximity of buildings and roads. Any services crossing slopes at risk of lateral spread will need to be designed accordingly."

- The average soil profile consists of approximately 0.2m to 0.4m of topsoil, over 7.6m to 18.8m silt (loess) sometimes interbedded with silty sand below 15m deep and clay, sand, and gravel deeper than 15m, over basalt.
- For planning purposes, it is considered that the following permanent slope batter angles are generally suitable for the site: Soil (typically loess): 1V:2H (could be steeper with specific design). Rock (basalt): 1H:1V.
- Low-lying areas near the existing ponds and Te Ahi Tarakihi Creek could include compressible soils.

Any filling will be in accordance with NZS4431:2022.

Earthworks made at proximity of the existing power assets will need to consider the New Zealand Electrical Code of Practice for Electrical Safe Distances requirements and may necessitate coordination with the powerline owners.

During the construction of the project, the contractor will need to protect the environment from adverse effect of construction activity in respect of the ECAN – Erosion & Sediment control Toolbox for Canterbury.

9 CONCLUSION

This report has identified the existing infrastructure at proximity to the site and listed the potential servicing options for the FDA's 1, 2 and 4.

APPENDIX 1 - Conceptual overland flow path strategy

APPENDIX 2 – Conceptual options for storing stormwater

APPENDIX 3 – Concept layout for a gravity system with pumpstations

GENERAL NOTES

1. This concept based on Common Ground "draft lot layout", dated 09/04/2024 and is to show the new collector road alignments.
2. For the purpose of concept design, the aesthetic, braking, visibility and intersections design parameters and/or requirements were not taken into consideration. Vertical curves are to be added at a later stage, where required.
3. Optimisation can be made in critical locations, in consideration of rock presence and depth, cycling lanes, trucks, maximum gradients, number and length of curves, lot encroachments, etc. For example, the road reserve for the collector roads could be reduced to approximately 15m, subject to approval by council, and batter could be made steeper where adequate. Where roads are next to a reserve, retaining walls or stabilised batter could be the best option to avoid a long tie-in to existing.
4. Wastewater and stormwater systems to be integrated in design.
5. Preliminary cross-section for collector roads has a 13.6m carriageway width and 22m road reserve width. Preliminary cross-section for local roads has a 10m carriageway width and 20m road reserve width. From the road boundary, road ties to the existing ground at a slope of 1:2 in cuts and 1:3 in fills. Fill area are shown in green and cut area are shown in red.
6. Power assets to be relocated where required and if possible at an acceptable cost (to be confirmed).

240409 draft block layout

EXTENT OF FUTURE DEVELOPMENT AREA (FDA) 1/2/4

ROAD 1 | ROAD 2 | ROAD 3 | ROAD 4 | ROAD 5

PRIVATE ROAD

KELLANDS HILL ROAD

PAGES ROAD

MOUNTAIN VIEW ROAD

MORGANS ROAD

ALPINE CLOSE

LOCHERN RISE

GLANIS STREET

HUNTER HILLS DRIVE

MOUNTAINVIEW HIGH SCHOOL

MOUNTAIN VIEW VILLAGE

TE AHI TARAKIHI CREEK

TIMARU ELECTRICAL SUBSTATION

WELLICOE STREET

GOULDS ROAD

OLD NORTH ROAD

GRANTS ROAD

ANDREW STREET

USK STREET

ARUN STREET

KELVIN STREET

SELWYN STREET

OHHV | UGHV | HV

2 Green Network

3 Main Connection

3 Network Connection

3 Future Connection

2 Local Road

client TDC

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MASTER BUILDERS

Revision	Amendment	Revision Date
a	CONCEPT	22-02-2024
b	CONCEPT	21-03-2024
c	CONCEPT	28-03-2024
d	CONCEPT	10-04-2024
e	CONCEPT	07-06-2024
f	CONCEPT	08-07-2024

Client: **Timaru District Council**

Project: **FDA 1/2/4 Timaru**

Project No. **1006**

Designed: **BS**
Drawn: **BS**
Approved: **-**
Date **08-07-2024**
Scale **1 : 8000**

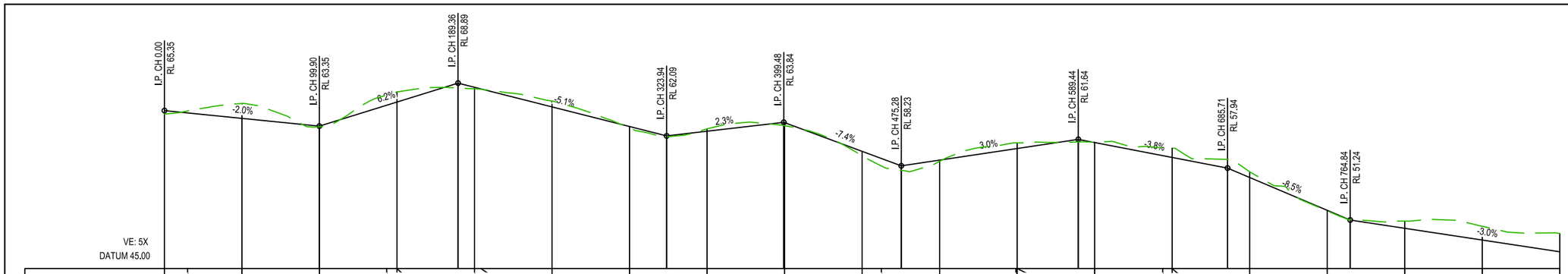
Title: **Roading Plan (Overall)**

CONCEPT

Sheet: **C200**

Revision: **f**

Original sheet size A3 (420x297)



GENERAL NOTES

1. Refer to notes on drawing C200.

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DATUM 45.00

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EXISTING LEVELS	64.90		66.26	63.27		67.75	68.17		66.58	63.16	63.00	63.41	59.54		58.81		61.18	61.27		60.52	57.46	52.42	51.10	50.44	49.51
DEPTH	0.44	-0.26	-1.92	0.08	-1.31	-1.30	0.19	0.05	-0.75	0.14	-0.30	0.39	0.56	0.97	0.16	-0.75	-0.72	-0.03	-1.02	-1.20	-0.73	0.08	-0.92	-1.77	-2.35
CHAINAGE	0.00	14.93	50.00	100.00	143.36	150.00	200.00	204.15	250.00	300.00	350.00	400.00	450.00	462.44	500.00	549.19	550.00	600.00	643.90	650.00	700.00	750.00	800.00	850.00	900.00

ROAD 1 LONG SECTION

VE: 5X
DATUM 30.00

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EXISTING LEVELS	49.51		47.20	46.54		45.11		46.90	48.22	42.90	43.06		42.01	38.11		39.59	44.89		46.02		48.47	45.97	42.49	43.28	37.69		31.09
DEPTH	-2.35	-2.17	-1.42	-1.63	-0.72	-1.07	-1.50	-1.61	-0.82	-0.79	-1.86	-2.27	-1.70	1.96	2.11	1.24	-0.30	-0.31	-0.26	-0.29	0.67	-0.37	-0.30	-1.55	-0.85	-0.82	-0.26
CHAINAGE	900.00	907.33	950.00	1000.00	1031.79	1050.00	1096.71	1100.00	1150.00	1200.00	1250.00	1267.55	1300.00	1350.00	1384.04	1400.00	1450.00	1452.00	1500.00	1507.56	1550.00	1600.00	1650.00	1700.00	1750.00	1752.28	1800.00

ROAD 1 LONG SECTION

VE: 5X
DATUM 15.00

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EXISTING LEVELS	31.09	31.35	31.17	29.33	28.26	24.22	23.01	26.02		29.48		31.78	30.00	25.19		17.78	19.45	22.37		20.38	18.82		20.14	21.07		
DEPTH	-0.26	-1.19	-1.68	-0.52	-1.69	-1.11	-0.10	-0.80	-0.51	-0.51	-0.83	-1.07	-0.33	-1.29	-0.82	0.12	-0.55	-0.40	-0.43	-0.41	-0.01	-0.03	0.21	0.00		
CHAINAGE	1800.00	1850.00	1900.00	1950.00	2000.00	2050.00	2100.00	2150.00	2176.38	2200.00	2242.80	2250.00	2300.00	2350.00	2366.71	2400.00	2450.00	2500.00	2549.28	2550.00	2600.00	2606.73	2650.00	2673.11	2687.98	2688.00

ROAD 1 LONG SECTION

0
50
100
Meters

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MASTER BUILDERS

Revision	Amendment	Revision Date
a	CONCEPT	22-02-2024
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d	CONCEPT	08-07-2024

Client: **Timaru District Council**
Project: **FDA 1/2/4**
Timaru
Project No. **1006**

Designed: BS
Drawn: BS
Approved: -
Date 08-07-2024
Scale 1 : 3000

Title: **Roading Long Sections**
CONCEPT

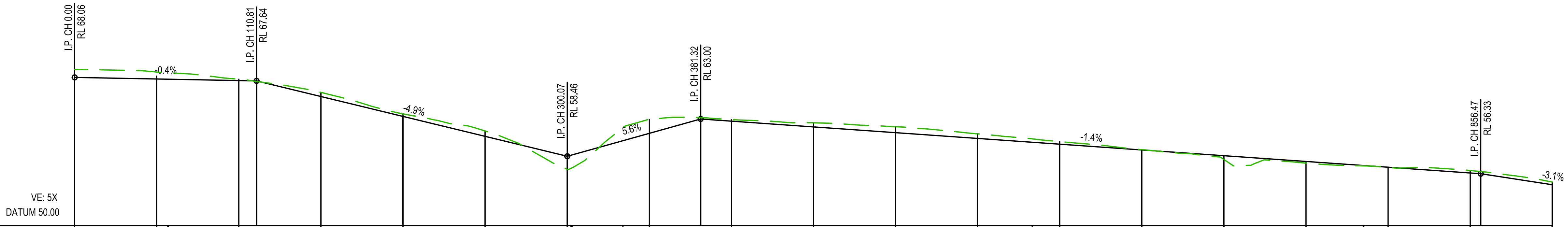
Sheet: **C221**
Revision: **d**

Original sheet size A3 (420x297)

NOTES: Do not scale from the drawings. All dimensions to be confirmed on site. This drawing is the copyright and property of Procerto Group Ltd and must not be retained, copied or used without authorisation.

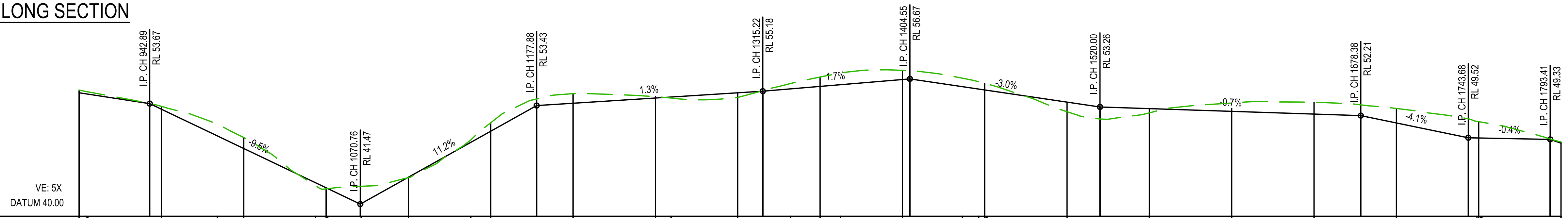
GENERAL NOTES

1. Refer to notes on drawing C200.



CHAINAGE	0.00	50.00	56.39	100.00	150.00	200.00	250.00	300.00	301.74	333.92	350.00	400.00	450.00	500.00	550.00	583.28	600.00	650.00	700.00	750.00	785.08	800.00	850.00	900.00
DESIGN LEVELS	68.06	67.87	67.85	67.68	65.74	63.31	60.89	58.46	58.55	60.35	61.25	62.74	62.04	61.34	60.63	60.17	59.93	59.23	58.53	57.83	57.34	57.13	56.43	54.99
EXISTING LEVELS	69.04	68.72		67.84	66.25	63.62	61.54	56.87			62.94	62.92	62.54	62.06	61.19		60.24	59.27	58.07	57.63		57.11	56.72	55.32
DEPTH	-0.98	-0.85	-0.79	-0.16	-0.51	-0.31	-0.65	1.60	1.62	-1.59	-1.69	-0.18	-0.50	-0.73	-0.56	-0.41	-0.31	-0.04	0.46	0.20	0.04	0.02	-0.30	-0.32

ROAD 2 LONG SECTION



CHAINAGE	900.00	903.91	950.00	983.98	1000.00	1043.60	1050.00	1071.29	1100.00	1137.92	1150.00	1200.00	1250.00	1259.06	1300.00	1332.06	1350.00	1362.45	1400.00	1436.43	1446.36	1450.00	1500.00	1550.00	1600.00	1650.00	1700.00	1748.95	1750.00	1800.00
DESIGN LEVELS	54.99	54.87	52.99	49.75	48.22	44.06	43.45	41.53	44.74	48.97	50.32	53.72	54.35	54.47	54.99	55.46	55.76	55.97	56.60	55.73	55.44	55.33	53.85	53.06	52.73	52.40	51.32	49.50	49.50	48.87
EXISTING LEVELS	55.32		53.34		49.56		43.32		44.69		51.35	54.88	54.52		54.43		56.90		57.71			56.13	52.69	52.55	53.75	53.85	53.08		51.48	49.01
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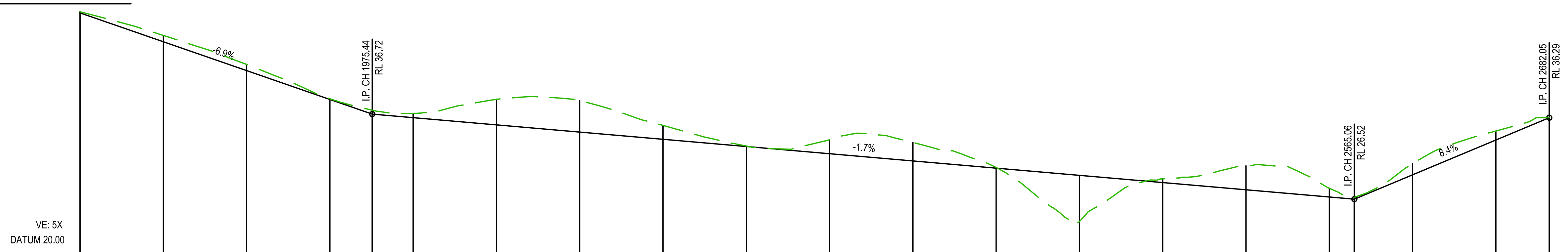
ROAD 2 LONG SECTION



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DESIGN LEVELS	48.87	45.41	41.94	38.48	36.30	36.05	35.43	34.57	33.70	32.84	31.97	31.11	30.52	30.24	29.38	28.51	27.65	27.17	26.78	29.44	32.68	33.61	36.29	
EXISTING LEVELS	49.01	46.16	42.69	38.57	36.81		38.50	38.34	35.37	32.89	33.64	33.33		30.32	23.83	28.95	30.52		27.83	30.77		34.69	36.29	
DEPTH	-0.14	-0.76	-0.75	-0.09	-0.52	-1.04	-3.07	-3.77	-1.67	-0.06	-1.67	-2.22	-1.08	-0.08	5.55	-0.44	-2.88	-3.04	-1.05	-1.33	-1.41	-1.07	0.00	

ROAD 2 LONG SECTION

0 50 100 Meters

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MASTER BUILDERS

Revision	Amendment	Revision Date
a	CONCEPT	21-03-2024
b	CONCEPT	28-03-2024
c	CONCEPT	08-07-2024

Client: Timaru District Council

Project: FDA 1/2/4 Timaru

Project No. 1006

Designed: BS
Drawn: BS
Approved: -
Date: 08-07-2024
Scale: 1 : 3000

Title: Roading Long Sections

CONCEPT

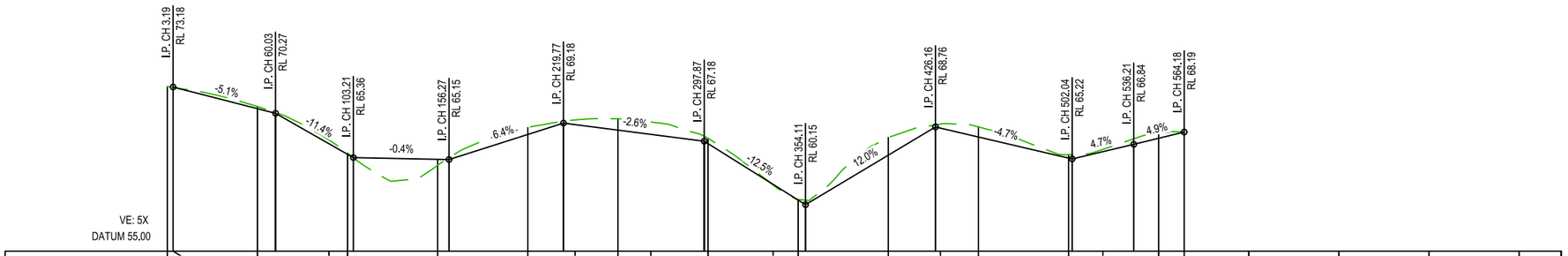
Sheet: C222

Revision: C

Original sheet size A3 (420x297)

GENERAL NOTES

1. Refer to notes on drawing C200.



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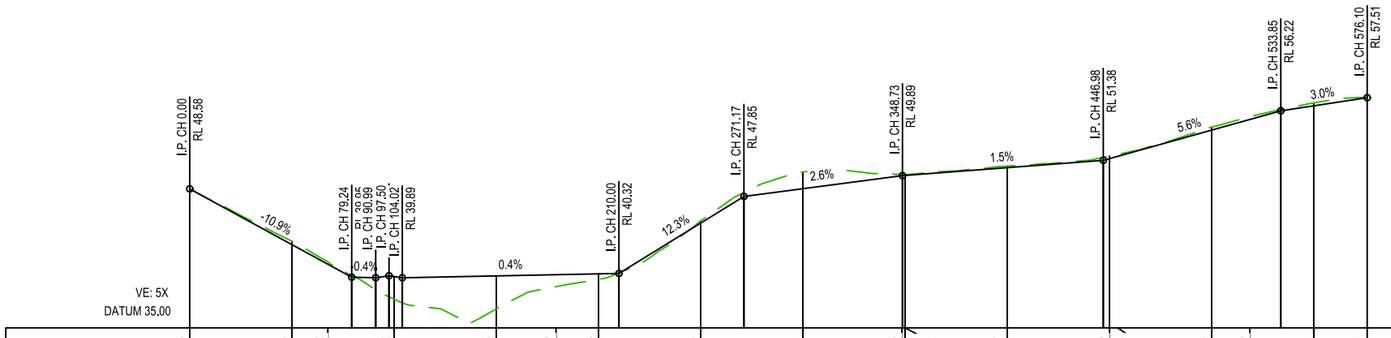
ROAD 3 LONG SECTION



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DEPTH	0.00	-0.33	-0.23	2.22	3.23	1.17	0.54	-0.22	-1.64	-0.11	-0.07	-0.15	-0.26	-0.20	-0.29	-0.28	-0.29	-0.06						
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ROAD 4 LONG SECTION

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Revision	Amendment	Revision Date
a	CONCEPT	21-03-2024
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c	CONCEPT	08-07-2024

Client: Timaru District Council

Project: FDA 1/2/4 Timaru

Project No. 1006

Designed: BS
Drawn: BS
Approved: -
Date 08-07-2024
Scale 1:3000

Title: Roading Long Sections

CONCEPT

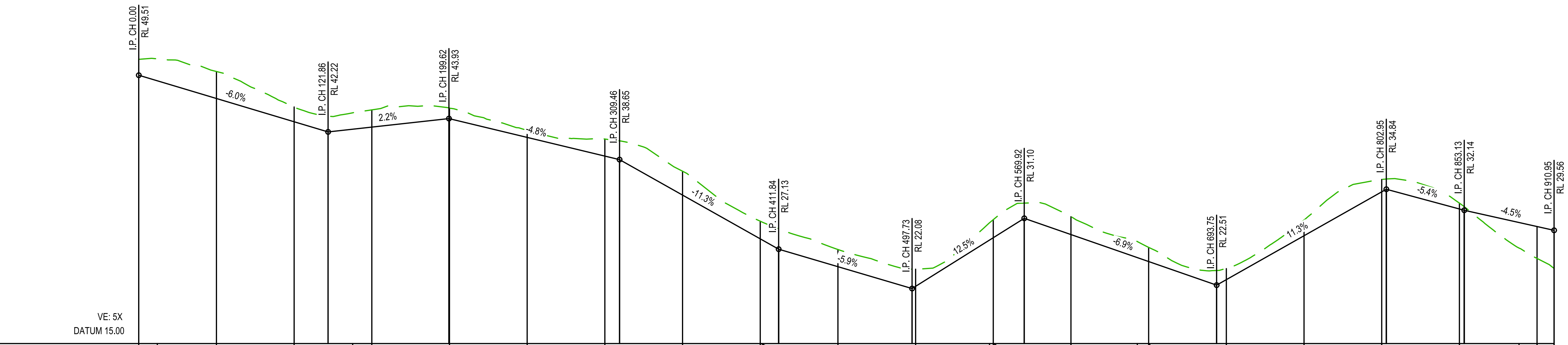
Sheet: C223

Revision: C

Original sheet size A3 (420x297)

GENERAL NOTES

1. Refer to notes on drawing C200.



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EXISTING LEVELS	51.55		49.99	45.43		45.05	45.28	42.42	41.30	37.17	30.74		27.09	24.57		30.94	31.31		27.37	24.64	30.88	36.11	33.06		25.95	24.66
DEPTH	-2.04	-2.82	-3.47	-1.90	-2.11	-2.21	-1.37	-0.91	-2.19	-3.07	-2.27	-2.28	-2.21	-2.21	-2.22	-2.32	-2.30	-2.07	-1.83	-1.42	-2.01	-1.59	-0.75	3.28	4.10	4.90
CHAINAGE	0.00	11.92	50.00	100.00	137.70	150.00	200.00	250.00	300.00	350.00	400.00	400.53	450.00	500.00	547.58	550.00	600.00	642.70	650.00	700.00	750.00	800.00	850.00	888.41	900.00	910.95

ROAD 5 LONG SECTION

0 50 100 Meters

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MASTER BUILDERS

Revision	Amendment	Revision Date
a	CONCEPT	08-07-2024

Client: Timaru District Council
Project: FDA 1/2/4 Timaru
Project No. 1006

Designed: BS
Drawn: BS
Approved: -
Date: 08-07-2024
Scale: 1 : 3000

Title: Roading Long Sections
CONCEPT

Sheet: C224
Revision: a

Original sheet size A3 (420x297)

FDA4
FDA4
FDA4
FDA2
FDA2
FDA1
FDA4
FDA1
FDA1
FDA1
FDA1
FDA1
FDA2

key

	Type
	1 Existing Network
	2 Main Collector
	2.1 Network Connection
	3 Walking/Cycling routes
	4 Residential Development
	5 Naturalised Open Space
	6 Formalised Open Space
	7 Commercial Node
	8 FDA Boundary

commonground

client: TDC

0 200 400m

rev	date	details	by
a	21.01.2025	issue to consultants	cc
b	30.01.2025	issue	cc
c	03.02.2025	issue	cc
d	05.02.2025	draft issue	cc

scale 1:5000 size A2

Do not scale drawings. Verify all dimensions on site

drawn CC date 05.02.2025

project FDA 1/2/4

name outline development plan

drawing

project 2323 rev a

19 February 2025

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Level 1, 279 Montreal Street
PO Box 365, Christchurch 8140
O - 03 365 5570
info@novogroup.co.nz

Davis Ogilvie (Aoraki) Ltd
14 The Terrace
Timaru 7910

Attention: Glen McLachlan

By email: glen@do.nz

Dear Glen,

PLANNING ADVICE CONCERNING THE NPS-UD PROPOSED TIMARU DISTRICT PLAN

1. This memo provides an overview of our interpretation of the National Policy Statement on Urban Development 2020 (NPS-UD) concerning the Timaru Proposed District Plan (PDP) in response to the preliminary s42A report prepared by Matt Bonis.

2. As summarised in the preliminary s42A report, the NPS-UD aims to ensure that sufficient land is available for housing and businesses. Growth is intended to be integrated with infrastructure planning and funding and occur in appropriate locations to support a well-functioning urban environment.

3. Under Policy 2, local authorities are required to provide for expected demand over the short (three years), medium (ten years), and long terms (30 years). While the policy sets a minimum threshold ("sufficient development capacity"), it does not preclude councils from enabling additional capacity where it contributes to a well-functioning urban environment and is integrated with infrastructure planning and funding. In fact, the words "at least" encourage councils to exceed mere sufficiency.

4. Beyond the question of capacity, Policy 1 mandates councils to assess rezoning requests in terms of their contribution to a well-functioning urban environment. A well-functioning urban environment is defined as one that enables a variety of homes that meet the needs of the community in terms of type, price and location among other factors (Policy 1(a)).

5. The economic assessment undertaken by Property Economics has identified a realisable capacity of almost 4,000 dwellings within the existing urban areas and approximately 3,500 dwellings within the Future Development Areas. However, it remains unclear whether these dwellings correspond to the community needs in terms of housing type, price and location.

6. For example, projections indicate an aging population. As a result, demand for smaller residential units and retirement villages rather than standalone homes is expected to increase for a growing segment of the community. At the same time, unlike in large urban centres such as Christchurch, there appears to be ongoing demand among families for properties with standalone houses that exceed the modelled 450m² allotment size.

7. Likewise, in terms of industrial land supply, Policy 1(b) mandates local authorities to provide sufficient land that meets the varying location and site size requirements of different business sectors.

8. In summary, local authorities must ensure at least sufficient capacity to meet demand across various housing types / land size, locations and price points. If evidence was obtained that demonstrates that the PDP does not adequately accommodate these evolving needs, the Council will need to consider alternative approaches to address the shortfall.

Yours sincerely,

Novo Group Limited

Mona Neumann

Planner

M: 021 197 6585 | **O**: 03 365 5570

E: mona@novogroup.co.nz | W: www.novogroup.co.nz

1214002

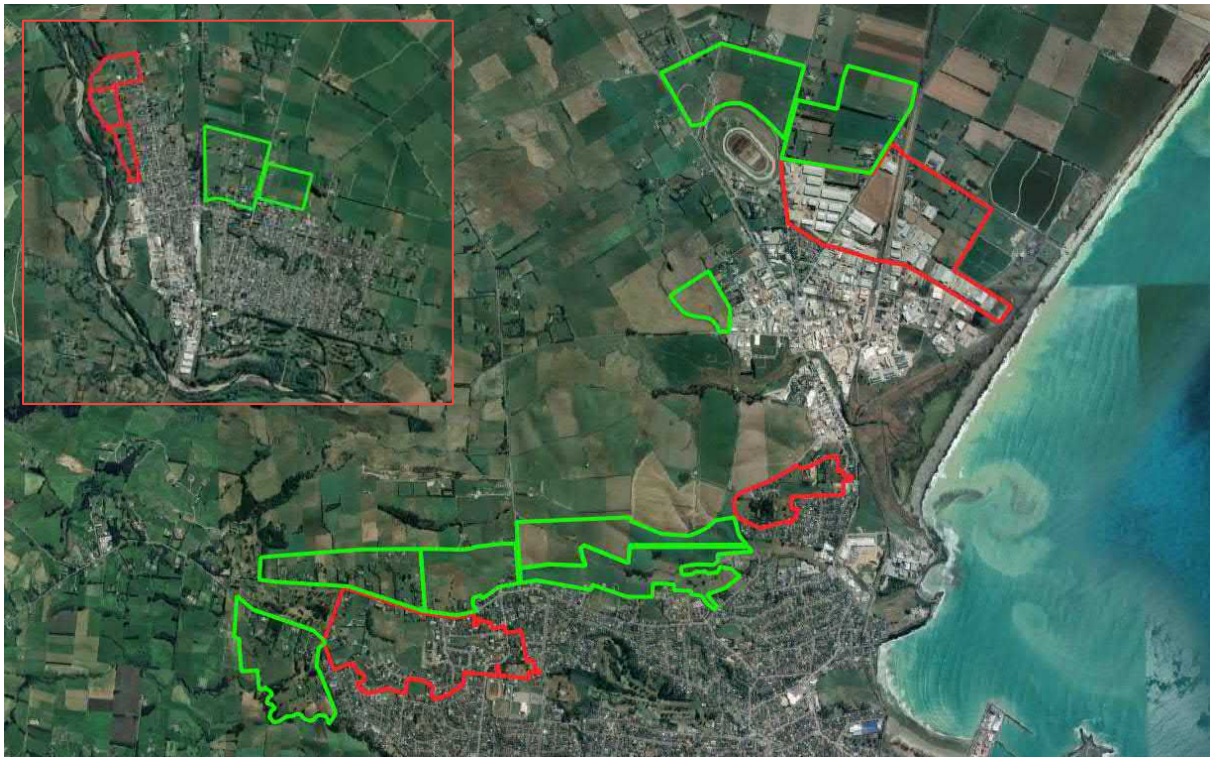
Timaru District Council

TIMARU AND TEMUKA GROWTH CAPACITY ASSESSMENT

WATER

18 DECEMBER 2023

CONFIDENTIAL



TIMARU AND TEMUKA GROWTH CAPACITY ASSESSMENT

WATER

Timaru District Council

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REV	DATE	DETAILS
00	18 December 2023	Final Report

	NAME	DATE
Prepared by:	Abhi Ramola	18 December 2023
Reviewed by:	Gail Cooper, Daniel Johnson	18 December 2023
Approved by:	Gail Cooper	18 December 2023

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TABLE OF CONTENTS

ABBREVIATIONS

AC	Asbestos cement
CI	Cast iron
CCZ	City Centre Zone
FDA	Future Development Area
GRZ	General Residential Zone
LoS	Level of Service
MRZ	Medium Density Residential Zone
MUZ	Mixed Use Zone
NZFF CoP	New Zealand Fire Service Firefighting Water Supplies Code of Practice
PDD	Peak Day Demand
PS	Pump Station
WTP	Water Treatment Plant

EXECUTIVE SUMMARY

Timaru District Council (TDC) wishes to quantify the impacts of their proposed future growth areas within Timaru and Temuka on the existing water networks. Additionally, TDC wants to identify locations on the water network that have insufficient capacity for the proposed future demand and will require upgrading.

Growth scenarios for the Timaru and Temuka models were created with the residential and commercial demand for the development areas identified by TDC. To assess what upgrades would be required to service the future development areas the following performance criteria were applied:

- Maintaining a pressure level of service (LoS) of 200 kPa (20 m) for existing and future customers. For Timaru a higher pressure LoS was considered for three key customers in Washdyke (McCain, Alpine Salmon, and Smithfield)
- Maximum headloss ≤ 5 m/km for pipes > DN 200
- Maximum velocity ≤ 1.5 m/s for normal conditions, < 3.0 m/s for fire flow conditions
- Maintaining 100 kPa during FW2 (25 L/s) and FW3 (50 L/s) fire flow.

The hydraulic assessment predicted that:

- No pressure LoS or FW2 fire flow capacity issues are predicted for the residential development areas in Temuka. The residential development areas can be connected to the reticulation once the Temuka reservoir and pump station have been commissioned (there are no commercial development areas planned for Temuka).
- The additional demand from the residential and commercial development areas in Timaru results in a significant increase in the number of properties with pressure LoS below 20 m (increases from nine to 171 properties). To resolve these issues the following is recommended:
    - Upgrade the existing DN 300 cast iron main in Morgans Road to DN 500 PE 100 PN 12.5. Some development (approximately 200 lots) for Elloughton South (FDA1) and Elloughton North (FDA 4) can progress in advance of the Morgans Road pipe upgrade. However, this will need to be located in the lower ground elevation areas close to Old North Road / Jellicoe Street.
    - Upgrade the Gleniti pump station. Further investigation is required to determine the optimal location and size of the pump station upgrade, including considering the benefits of rezoning Claremont customers onto the Gleniti zone. Additional storage at Gleniti Reservoir and a dedicated inlet main to the reservoir may also be required. We recommend that all the development areas in the Gleniti zone be put on hold until this has been investigated further.
- Previous growth assessment and the 2015 Timaru Water Supply Strategy were based on an ultimate demand of 35 ML/day and the availability of the existing Timaru sources (Opihi and Pareora). With the latest growth, this has increased to 40 ML/d. It is recommended that a review of the future strategy for Timaru is undertaken to consider, for example:
    - The demand management that could be achieved from universal metering which TDC currently have programmed to be implemented over 2025-2029.

- Whether demand in Washdyke can be reduced through water-saving initiatives such as greywater recycling or more efficient water use measures by commercial and industrial consumers.

This assessment provides an initial indication of capacity for growth and potential pipe upgrades. We recommend further master planning and optioneering be undertaken to optimise the long-term plan for water infrastructure in Timaru – in particular for the Gleniti zone.

1 INTRODUCTION

WSP was approached by the Timaru District Council (Council) to provide hydraulic modelling services to quantify the impact of proposed future growth areas in Timaru and Temuka. The proposed growth is comprised of committed developments, consented developments, Future Development Areas (FDA), and infill development.

1.1 BACKGROUND

The hydraulic assessment was undertaken to determine the impact on the existing network and to determine the available capacity to supply the proposed growth. The current Timaru and Temuka peak day water supply models were utilised.

The Timaru and Temuka water supply hydraulic models were calibrated in 2015 with peak day models produced for system performance assessment based on historical demand telemetry data. The models were utilised as the base models for each township to apply the growth demand and further investigate the infrastructure upgrades to supply the new development areas.

1.2 PROJECT OBJECTIVES

The objectives of this assessment were to:

1. Assess the impact of future growth on the existing network and current level of service (LoS)
2. Identify pipe upgrades to resolve the LoS deficiencies caused by future growth
3. Confirm which developments can proceed without pipe upgrades

1.3 REPORT STRUCTURE

The structure of this report is summarised below:

- Growth – growth areas and projected demand
- Assumptions – key assumptions specific to this project and applied to the modelling
- Modelling Assessment – model results and proposed upgrades
- Proposed Development Phasing – staging of developments
- Conclusions and Recommendations

2 GROWTH

TDC provided growth plans to identify the location, development type, and estimated number of units projected for the Timaru and Temuka townships.

A breakdown of the growth for each township is presented in this section of the report and has been applied to the hydraulic models as part of the modelling assessment.

Growth has been broken down into the following development types:

1. Residential/Urban Development
2. Rural Residential Development
3. Commercial Development
4. Committed Development
5. Intensification

2.1 DEMAND ASSUMPTIONS

Table 2-1 shows the peak day demand (PDD) values applied to the residential growth areas. These are based on the 2015 Timaru and Temuka calibrated models.

A peak factor of 2.3 was used for the residential PDD, based on the residential diurnal profiles from the 2015 Timaru and Temuka hydraulic models. A leakage rate of 150 L/connection/day has been applied to all new residential connections.

Table 2-1: Residential Connection Peak Day Demand

DEMAND AREA	PEAK DAY DEMAND (PDD) (L/PROP/DAY)	PEAK FACTOR
Timaru	970	2.3
Timaru – Gleniti	1,171	2.3
Temuka	1,293	2.3

Modelled commercial (industrial) peak day demand has been based on Table 5.1 of NZS4404:2010 (see Table 2-2). Similar to residential growth areas, a peak factor of 2.3 has been applied based on the standard 10-hour commercial profile in the calibration models for industrial growth areas. An estimated building footprint of 60%[1] of the total development area has been used, as there is no specific guidance within the Council's District Plan (refer to report, Growth Capacity Report v1.0_final - Section 2.3).

[1] Source: xlstructural.co.nz

Table 2-2: Commercial and Industrial Flows

INDUSTRY TYPE	DESIGN FLOW (L/S PER HA)
Light	0.4
Medium	0.7
Heavy	1.3

2.2 RESIDENTIAL / URBAN DEVELOPMENT

Eight areas (six in Timaru, and two in Temuka) of proposed residential growth were added to the growth scenarios. These are summarised in Table 2-3 and Table 2-4, and shown in Figure 2-1.

Table 2-3: Timaru - Residential Growth Areas and Estimated Peak Day Demand

REF	NAME	TYPE	NO. LOTS	AVG PDD (L/S)	PEAK DEMAND INC. LEAKAGE (L/S)	GROWTH NODE ID AND ELEVATION (M)
FDA1	Elloughton Road South	Future	598	6.7	16.5	FDA1_1 = 56 m FDA1_2 = 49 m FDA1_3 = 25 m
FDA2	Kellands Heights East	Future	440	4.9	12.1	FDA2_1 = 65 m FDA2_2 = 60 m FDA2_3 = 52 m
FDA4	Elloughton Road North	Future	542	6.1	14.9	FDA4_1 = 50 m FDA4_2 = 50 m FDA4_3 = 31 m
FDA14	Kennels Road	Future	646	7.2	17.8	FDA14_1 = 13 m FDA14_2 = 16 m
DEV1	Broughs Gully	Confirmed	200[2]	2.2	5.5	DEV1_1 = 21 m DEV1_2 = 30 m
DEV2	Gleniti Residential	Consented	700[1]	9.5	23.0	DEV2_1 = 81 m DEV2_2 = 79 m DEV2_3 = 63 m

[2] Lot numbers provided by Council (growth meeting 3rd August 2023)

Table 2-4: Temuka - Residential Growth Areas and Estimated Peak Day Demand

REF	NAME	TYPE	NO. LOTS	AVG PDD (L/S)	PEAK DEMAND INC. LEAKAGE (L/S)	GROWTH NODE ID AND ELEVATION (M)
FDA6	Factory Road	Future	215	3.2	7.8	FDA6_1 = 18 m FDA6_2 = 17 m
DEV3	Temuka Northwest	Confirmed	210[1]	3.1	7.6	DEV3_1 = 26 m DEV3_2 = 26 m DEV3_3 = 25 m

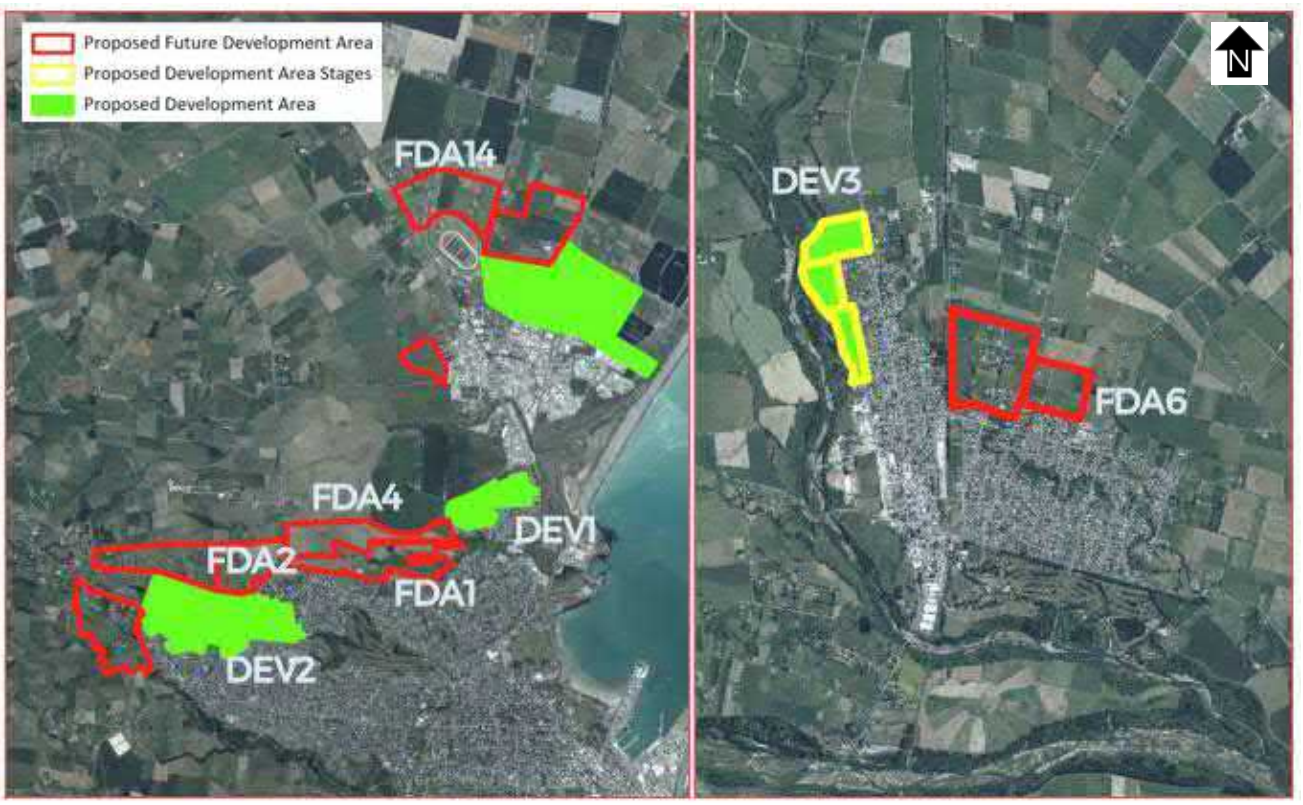


Figure 2-1: Residential growth areas

2.3 RURAL RESIDENTIAL DEVELOPMENT

Three areas (two in Timaru and one in Temuka) of proposed rural residential growth were added to the growth scenarios. These are summarised in Table 2-5 and Table 2-6, and shown in Figure 2-2.

Table 2-5: Timaru - Rural Residential Growth Areas and Estimated Peak Day Demand

REF	NAME	TYPE	NO. OF LOTS	AV. PDD (L/S)	PEAK DEMAND INC. LEAKAGE (L/S)	GROWTH NODE ID AND ELEVATION (M)

REF	NAME	TYPE	NO. OF LOTS	AV. PDD (L/S)	PEAK DEMAND INC. LEAKAGE (L/S)	GROWTH NODE ID AND ELEVATION (M)
FDA9	Gleniti North	Future	102	1.4	3.4	FDA9_1 = 90 m FDA9_2 = 58 m
FDA10	Kellands Heights West	Future	88	1.2	2.9	FDA10_1 = 90 m FDA10_2 = 70 m

Table 2-6: Temuka - Rural Residential Growth Areas and Estimated Peak Day Demand

REF	NAME	TYPE	NO. OF LOTS	AV. PDD (L/S)	PEAK DEMAND INC. LEAKAGE (L/S)	GROWTH NODE ID AND ELEVATION (M)
FDA7	Thompson	Future	86	1.28	3.10	FDA7 = 20 m

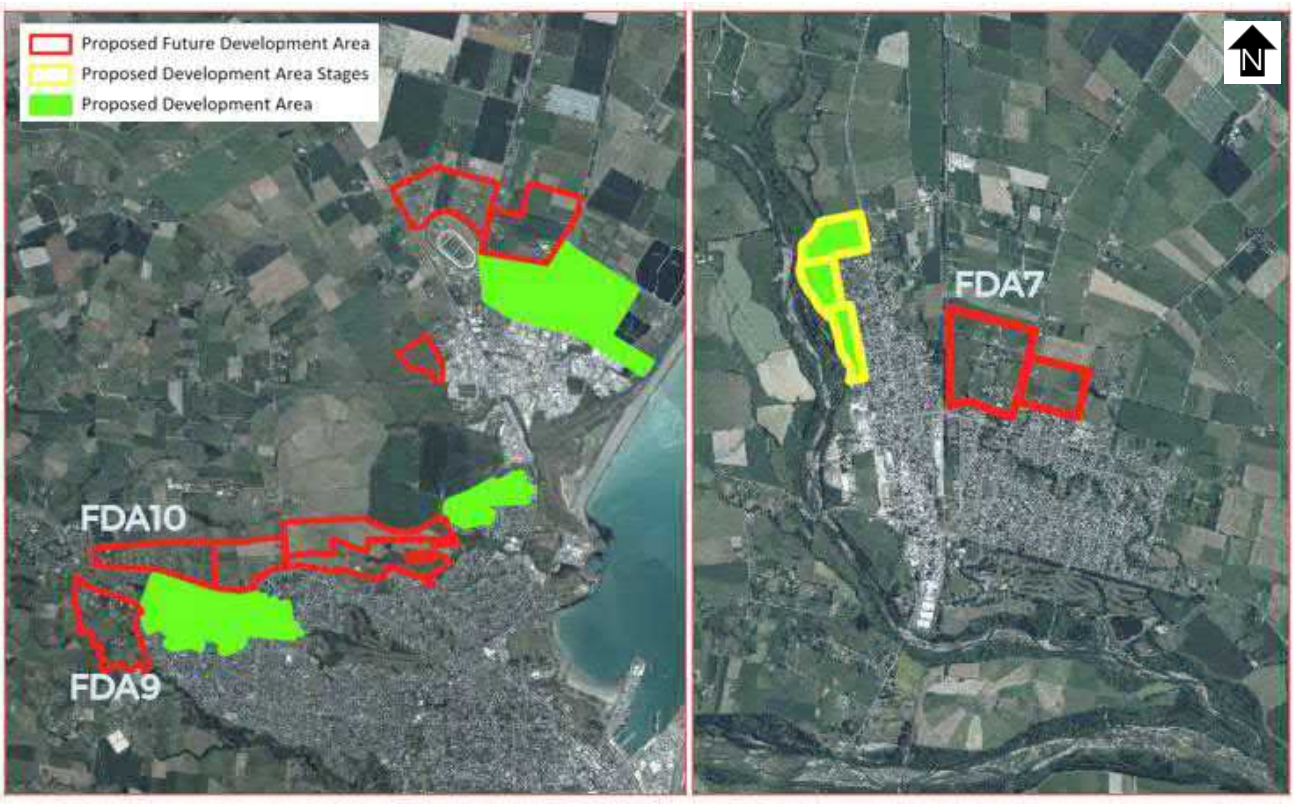


Figure 2-2: Timaru and Temuka rural residential growth areas

2.4 COMMERCIAL DEVELOPMENT

Three areas (all in Timaru) of proposed commercial growth were added to the growth scenario.

The commercial areas are summarised in Table 2-7, and shown in Figure 2-3.

Table 2-7: Commercial Development and Estimated Peak Day Demand

REF	NAME	TYPE	AREA (HA)	USE	AV. PDD (L/S)	PEAK DEMAND (L/S)	GROWTH NODE ID AND ELEVATION (M)
FDA12	Sir Basil Arthur Park	Future	13.3	Light, with potential for wet industries (Medium flow values used)	5.6	12.8	FDA12_1 = 10 m FDA12_2 = 8 m
FDA13	Seadown Road	Future	61.0	Light, with potential for wet industries (Medium flow values used)	25.6	58.9	FDA13_1 = 11 m FDA13_2 = 9 m
DEV3	Washdyke Expansion	Confirmed	56.1	East – heavy industry	43.8	100.6	WSD EXP East_1 = 11 m WSD EXP East_2 = 10 m WSD EXP East_3 = 9 m WSD EXP East_4 = 8 m
			36.7	West–light industry only	8.8	20.3	WSH EXP WEST_1 = 6 m

Figure 2-3: Timaru - commercial development areas

2.5 COMMITTED DEVELOPMENT

Several sites in Timaru have either already been granted consent or are under construction but are not yet included in the model. These were added to the growth scenario similar to the calculated residential and commercial demand.

The demand and pipework for the Showgrounds were previously added to the Timaru model as part of the Evans Street fire flow assessment undertaken in 2023 (based on the demand supplied by the developer).

Committed developments are summarised in Table 2-8, and shown and labelled in Figure 2-4.

No committed developments were identified in Temuka.

Table 2-8: Timaru - Committed Development, Residential and Estimated Peak Day Demand

REF	NAME	TYPE	NO. OF LOTS	AV. PDD (L/S)	PEAK DEMAND (L/S)	GROWTH NODE ID AND ELEVATION (M)
iii	Ascot Street	Rural Residential	160[3]	1.8	2.1	ASC ST = 12 m
iv	St. Vianneys	Residential	92	1.0	1.2	St.Viny_1 = 23 m St.Viny_2 = 36 m
v	Grey Road	Residential	48	0.5	0.6	CHPL-FH34790 = 19 m
vi	O'Neill Place	Residential	84	0.9	1.1	O'Neil = 8 m
vii	O'Neill Place Extension	Residential	48	0.5	0.6	O'Neil Ext = 25 m
viii	College Road	Medium Density Residential	45	0.5	0.6	COLG-FH34931 = 12 m

Table 2-9: Timaru - Committed Development, Industrial and Estimated Peak Day Demand

REF	NAME	AREA (HA)	USE	AV. PDD (L/S)	PEAK DEMAND (L/S)	GROWTH NODE ID AND ELEVATION (M)
i	Washdyke Flat Road	12.5	Light Industrial	3.0	6.9	WSH FLT RD_1 = 5 m WSH FLT RD_2 = 2 m
ii	Showgrounds	12.1	Light Industrial	9.4[4]	21.6	SHW GRDS = 10 m

[3] Assuming 1,200m^2 sections (growth meeting 3 August 2023)
[4] As per Showgrounds Water Supply Demand.pdf

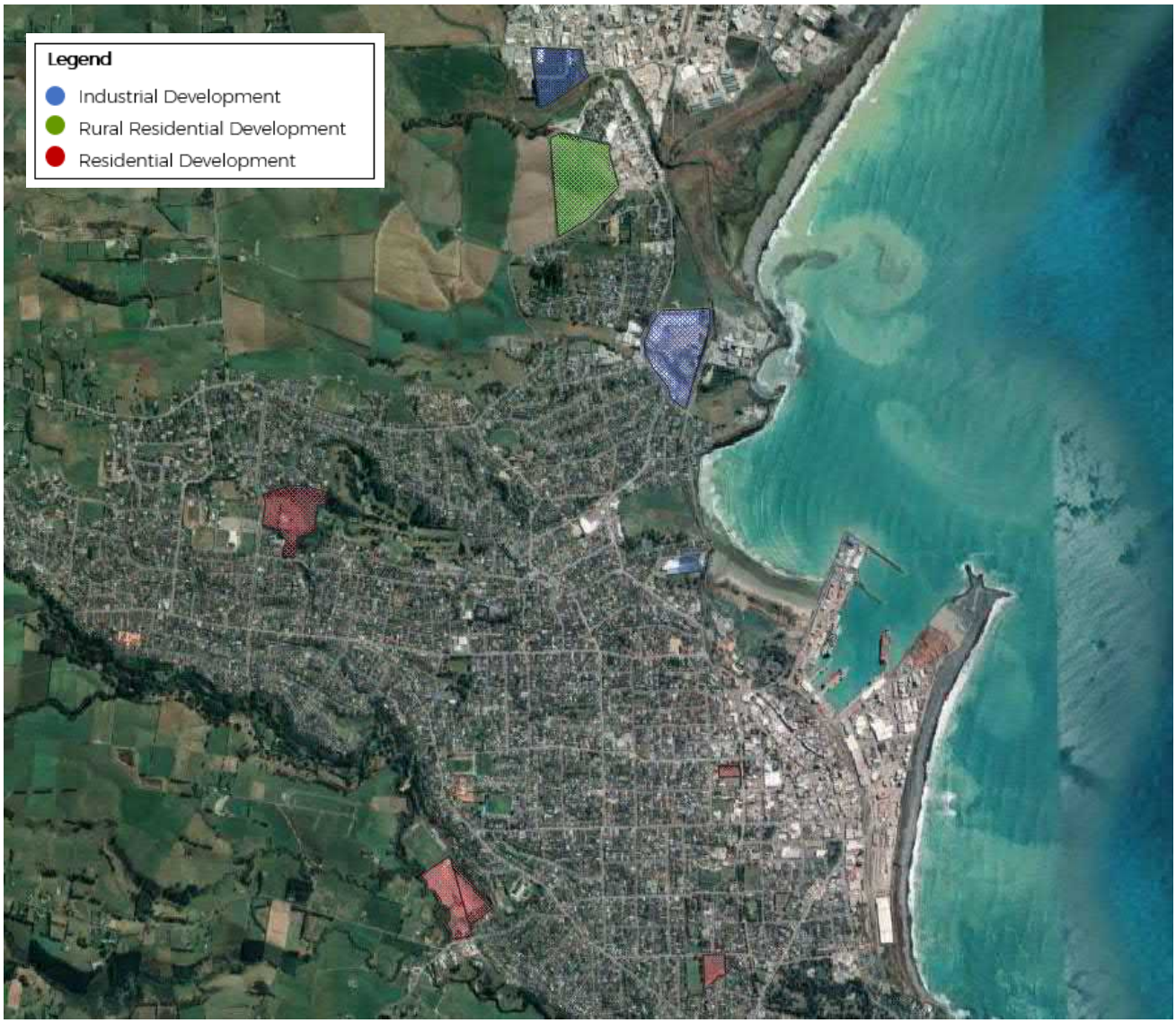


Figure 2-4: Timaru - committed development

2.6 INTENSIFICATION

Intensification has been included within areas zoned as Medium Density Residential (MRZ), City Centre (CCZ), and Mixed Use (MUZ) (see Figure 2-5). The council provided an estimate of 160 households to be accounted for within the Timaru CBD in areas zoned as CCZ or MUZ. The equivalent total PDD demand for these households has been evenly distributed across the 224 existing nodes in these zones – as an additional 693 L/connection/day {(160/224) x 970 L/connection/day}.

As there are no areas zoned MRZ, CCZ, or MUZ in Temuka, intensification has not been accounted for in the Temuka growth model.

Figure 2-5: Timaru - District Plan 2022 residential zones

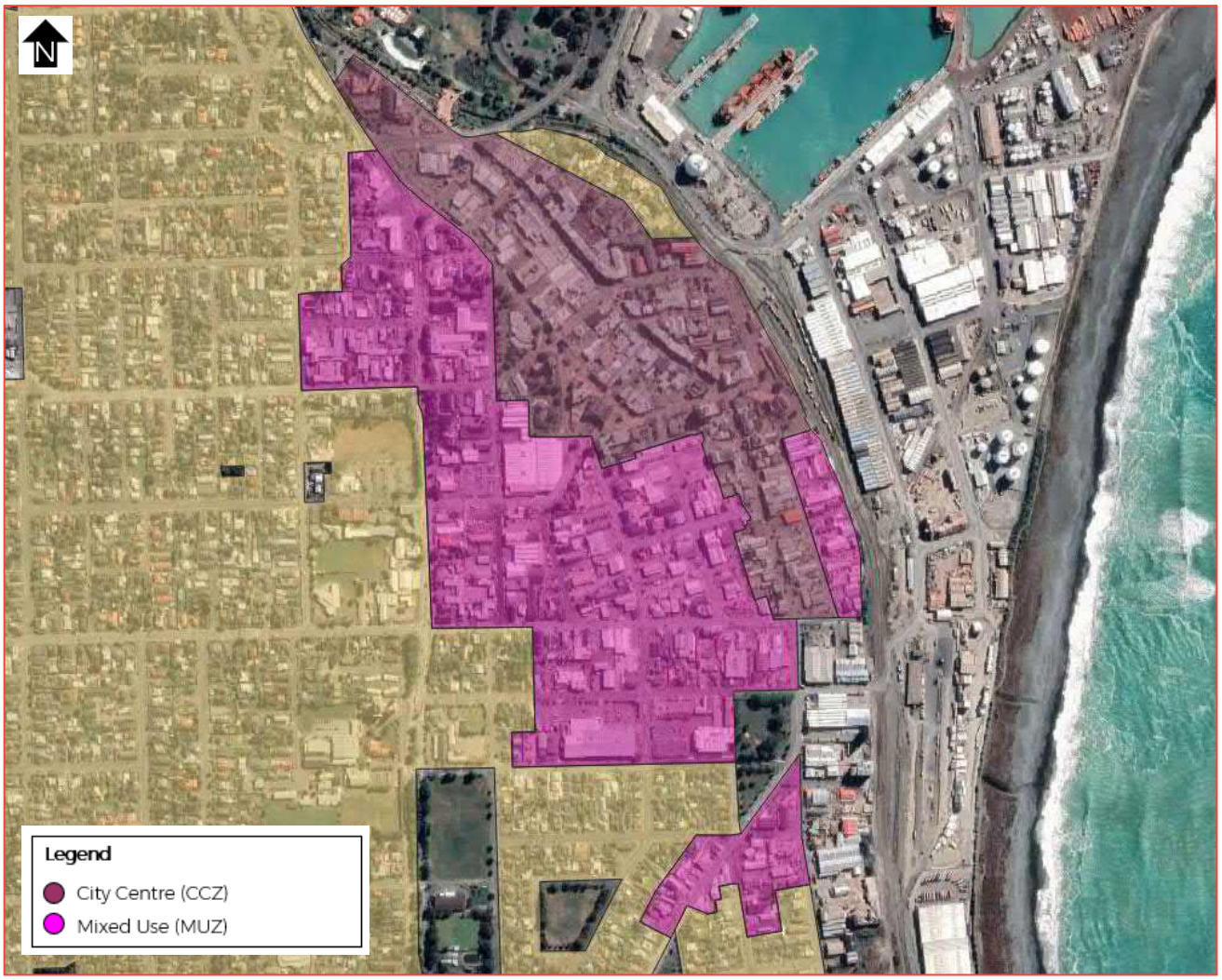


Figure 2-6: Timaru - District Plan 2022 CBD zones

3 ASSUMPTIONS

3.1 GENERAL

Assumptions that have been adopted for this project and applied to the modelling are summarised below:

1. Timaru Model Update Final Report (WSP, July 2017) and Temuka Model Update Final Report (WSP, August 2016) contain assumptions and limitations that apply to this project. The key assumptions and limitations from these are listed below (note that these are not all the assumptions, just key limitations relevant to this assessment):
    - The Timaru calibration model showed a larger response to hydrant flow tests in the Marine Parade and High St / Queen St areas compared to logged pressures.
    - The Timaru calibration model for the Pacific Street hydrant test indicated a significant anomaly between the model response (192 m pressure drop) versus the 31 m logged pressure drop.
2. The calibration and system performance of the 2015 models are also described in the Timaru Model Update Final Report (WSP, July 2017) and Temuka Model Update Final Report (WSP, August 2016).
3. The based demands in the 2015 models have not been updated to reflect the current peak day demand. This includes no changes to the existing customer connections, updates to diurnal patterns, customer demand or leakage rates.
4. Diurnal demand profiles have been applied as follows:
    - Residential: existing Temuka and Timaru peak day model residential demand profiles
    - Commercial: 10-hour standard profile
    - Leakage: leakage allowance of 150 L/connection/day for all residential growth (assumes 'new' pipe network).
5. All new pipes have been modelled with an equivalent pipe internal diameter for PE 100 PN 12.5. The exception is the Showgrounds development area which has been modelled with the PE 100 PN 16 pipe based on supplied developer as-built drawings.
6. Rural residential growth has been connected to the water network and is assumed to be on-demand.

3.2 MODELLING

A summary of the key assumptions and updates to the hydraulic models are presented below:

1. The Timaru and Temuka peak day water model was updated to InfoWorks Pro 2024.3.0 and used as the base models for this assessment.
2. A model update was carried out to include the new pipe assets installed since September 2017 (based on TDC GIS data) such as the Kellands Hill (Washdyke) and Temuka trunk main, as shown in Figure 3-1.

3 The following boundary conditions have been applied to the models for this assessment:

- Temuka: A pressure sustaining valve/pressure reducing valve (PSV/PRV) was installed on the Temuka trunk main in 2015 (adjacent to the new Temuka reservoir and pump station (PS)). The PSV / PRV maintains positive pressures in the DN 300 PVC-U section of the Temuka trunk main (north of Winchester) for flows up to 85 L/s. For flows above 75 L/s the new Temuka reservoir and PS (once commissioned) will operate to supply a delivery pressure of 31 m in the trunk main. For this growth capacity assessment, this arrangement has represented using a fixed head of 31 m in the trunk main at McNair Rd.
- Timaru: The 2015 Timaru model has Claremont reservoir level operating between 88.7 and 88.9 m. The reservoir level can drop lower - for example, the Washdyke Water Supply Strategy adopted a worse-case reservoir level of 83.6 m. The pressures reported in this assessment could be up to 5 m lower for the scenario whereby the Claremont reservoir level is not being maintained.

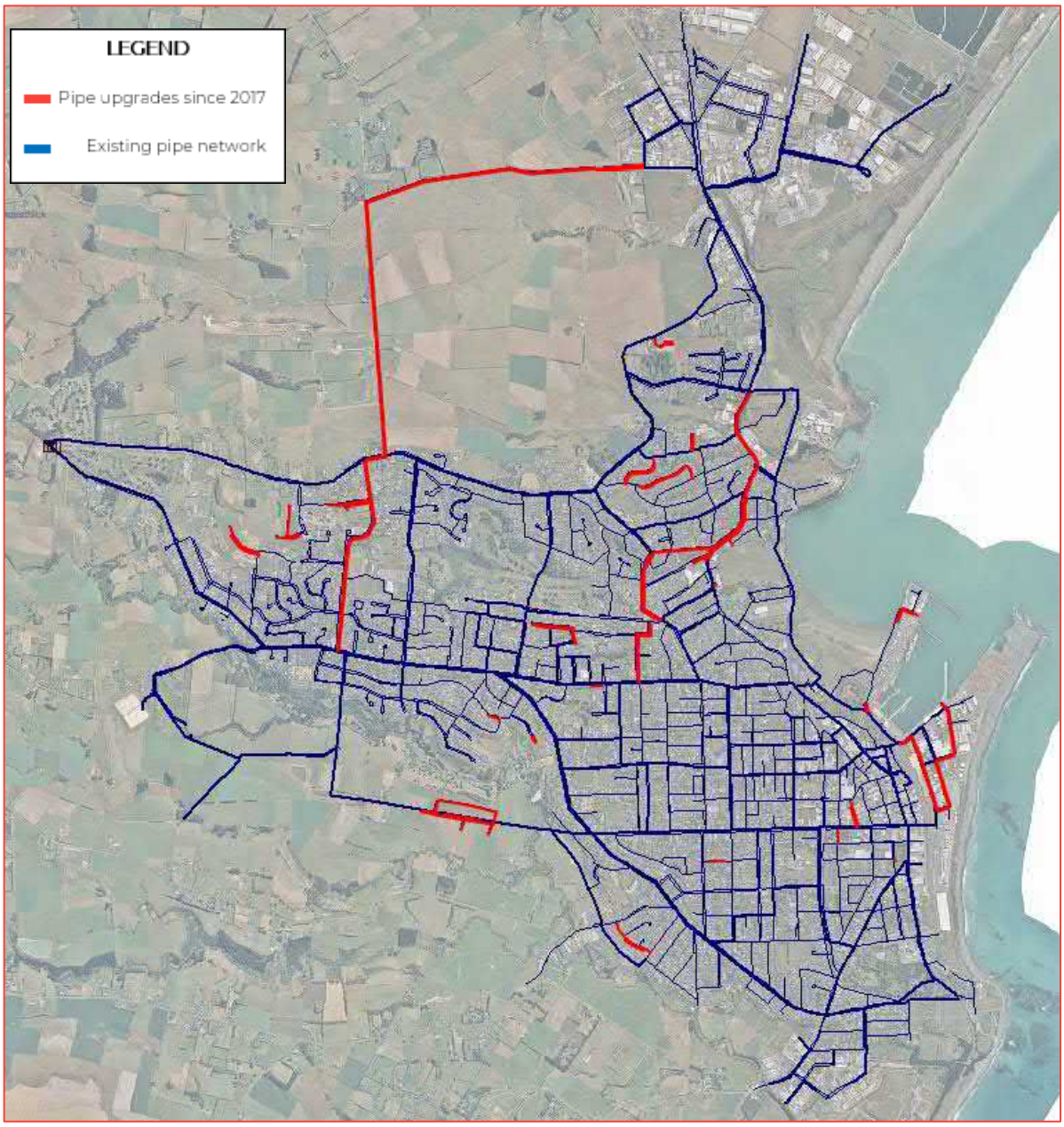


Figure 3-1: Base model update - pipe upgrades since 2017

4 MODELLING ASSESSMENT

4.1 APPROACH

For this assessment we have undertaken the following approach:

1. Assigned the growth to the base Timaru and Temuka models using demand nodes to represent the individual developments and connected them to the existing network with new pipes (ring mains) located within the growth areas (refer to Figure 4-1 and Figure 4-2). For the Timaru assessment the growth areas of Gleniti North (FDA9), Kellands Heights West (FDA10), Kellands Height (East) FDA2 and Gleniti Residential (DEV2) were connected to the Gleniti zone. All other growth areas were connected to the Claremont zone.
2. Applied demand and leakage based on the current 2015 models, as discussed in Section 3 to create the 'ultimate' future peak day demand (PDD).
3. Ran the base and ultimate demand models to assess the impact on the pipe capacity and levels of service (LoS) on the existing network.
4. Identified upgrades to resolve customer LoS deficiencies.
5. Determined which developments require upgrades to proceed.

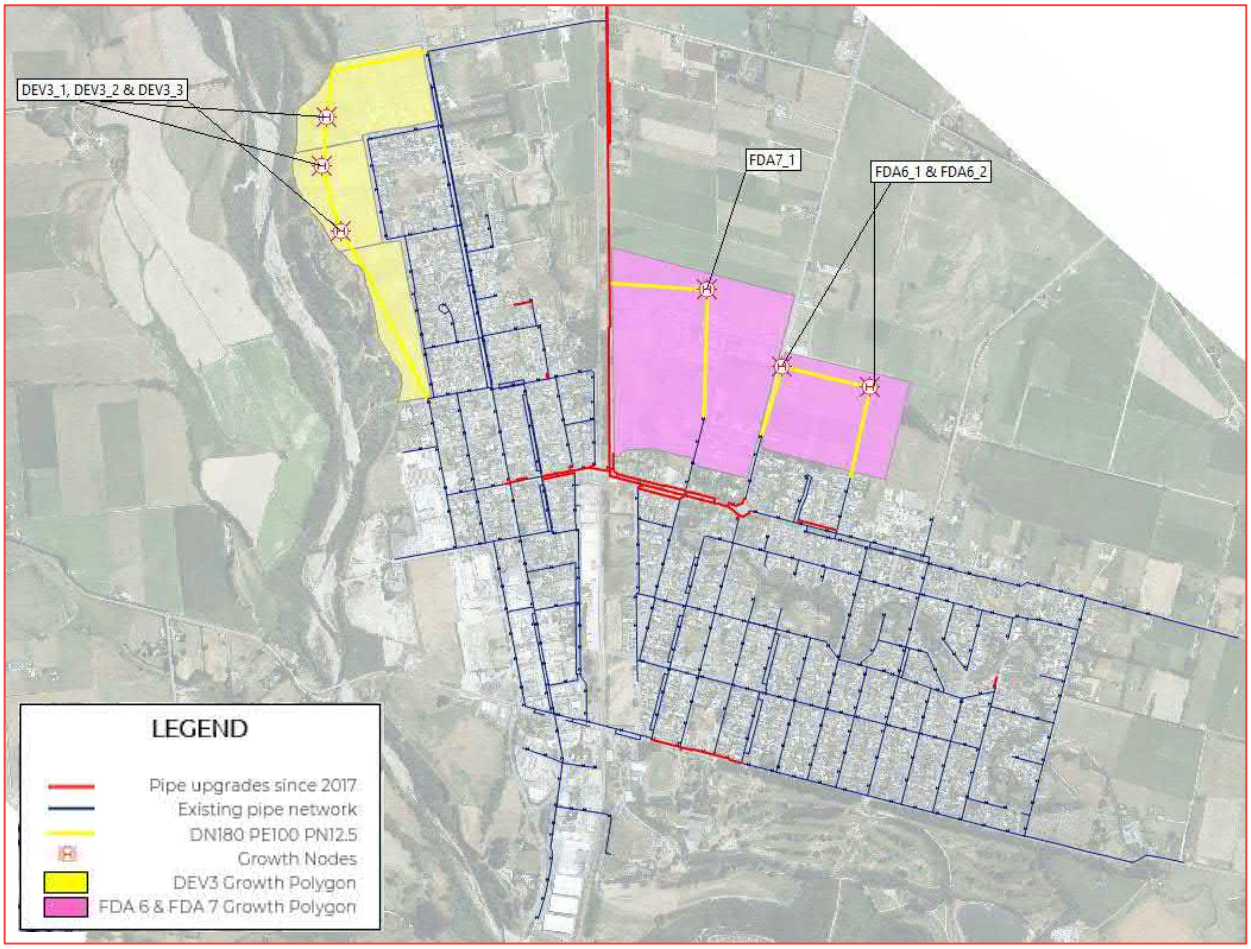


Figure 4-1: Temuka - growth nodes, pipe upgrades, and future development polygons

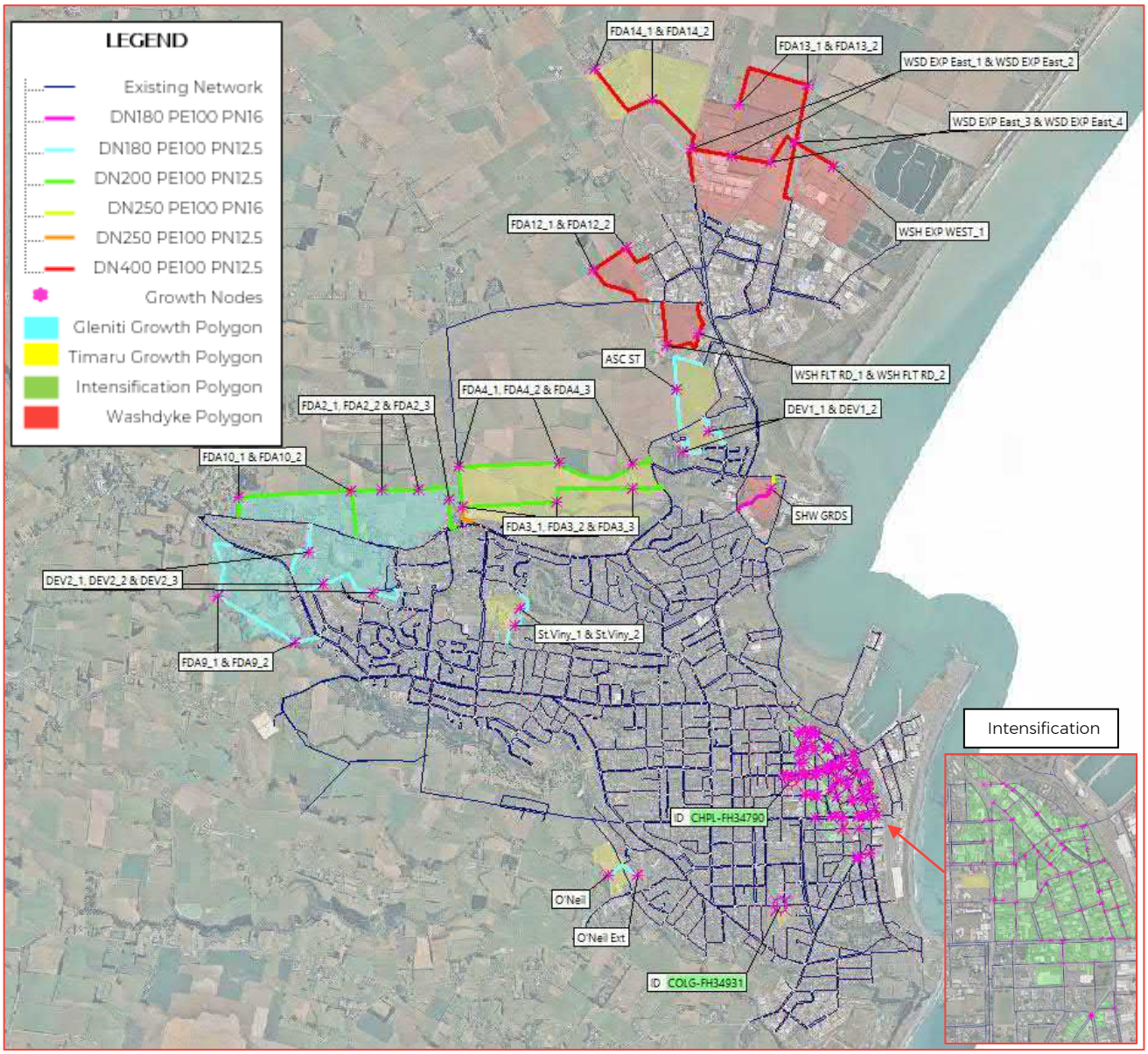


Figure 4-2: Timaru – growth nodes, pipe upgrades, and future development polygons

4.2 PERFORMANCE CRITERIA

For the system performance assessment, a set of criteria has been used to identify pipe capacity constraints and customer LoS issues, as presented below. The criteria have been used to size new pipe upgrades to meet the LoS requirements as stated.

4.2.1 HYDRAULIC

The parameters used to identify pipes that are at capacity or to size upgrades are based on the following criteria:

1 Maximum headloss ≤ 5 m / km for pipes > DN 200

2 Maximum velocity ≤ 1.5 m/s for normal conditions, < 3.0 m/s for fire flow conditions

3 Network pressure of 200 kPa is achieved in the development areas

4 A pass is achieved at hydrants for fire flow in the development areas (refer to Section 4.2.2)

5 For Timaru, the Washdyke Water Supply Strategy identified some specific pressure levels of service requirements for key customers in Washdyke – these have been considered when reviewing the impact of the additional growth in the Washdyke network.

- McCain (MEAD-WV36981Y) = 413 kPa
- Alpine Salmon WESC-WV37104Y = 300 kPa
- Smithfield (SHEF-FH39081 = 500 kPa

4.2.2 FIRE FLOW COMPLIANCE

4.2.2.1 FW2 FIRE FLOW

FW fire flow has been assessed as per the New Zealand Fire Service Firefighting Water Supplies Code of Practice (NZFF CoP). Each hydrant was assessed individually at 60% of the peak day maximum demand while maintaining 100 kPa of residual pressure based on:

- greater than 25 L/s from a single hydrant = compliant (pass)
- between 18 and 25 L/s from two adjacent hydrants = likely to be compliant (marginal)
- less than 18 L/s = unlikely to be compliant (fail)

4.2.2.2 FW3 FIRE FLOW

FW3 fire flow has been assessed for the Timaru industrial growth areas in Washdyke by simulating an exceptional demand of 50 L/s at 60% of the peak day maximum demand. These nodes are located at FDA12, FDA13, Showgrounds, Washdyke Flat Road, Washdyke Expansion East, and Washdyke Expansion West.

We have further investigated the impact of fire flow within the Ports industrial area, and proximity to Timaru CBD by applying an exceptional demand of 50 L/s at 60% of peak day maximum demand at Dawson Street (hydrant HYMN-FH34573).

4.3 SYSTEM PERFORMANCE

4.3.1 ULTIMATE DEMAND

With the addition of the growth areas and their associated demand to the Timaru and Temuka peak day models, the current (base) peak day and estimated future (ultimate) peak day demand are shown in Table 4-1.

Table 4-1: Peak Day Demand – Current (Base) and Ultimate

TOWN	CURRENT PDD (ML/d)	FUTURE PDD (ML/d)	% INCREASE
Timaru	28.5	40.4	42 %
Temuka	4.0	4.7	18 %

4.3.2 TIMARU

4.3.2.1 SYSTEM PERFORMANCE

The base model predicts a total of nine customers are receiving 20 m or below pressure LoS.

For the ultimate demand, this is predicted to increase to 171 customers with pressures below 20 m. Of these 171 customers, 145 are supplied from the Claremont reservoir while the remaining 26 customers are supplied from the Gleniti reservoir. Appendix A shows a comparison of the pressure LoS results between the base and ultimate demand models.

Pressure LoS issues are also predicted at the new development areas FDA9, FDA10, and DEV2 (supplied by Gleniti reservoir) and FDA1 and FDA4 (supplied by Claremont reservoir).

In terms of the Claremont zone:

- The residential development located in the north of Timaru causes excessive headlosses (>11 m/km) in the DN 300 cast iron (CI) main on Morgans Road. This is partially due to the newly commissioned Washdyke trunk main supplying the western end of Timaru, with flows of 200 L/s to supply the increased Washdyke demand. Furthermore, the FDA1 and FDA4 growth areas contribute to the peak instantaneous flows of up to 31 L/s in the CI main.
- In total 13 km of pipes with a diameter greater than 200 mm are experiencing headloss greater than 5 m/km, with 1.5 km of the Morgans Road CI main contributing to the pressure LoS issues in its associated area and the new growth areas of FDA1 and FDA4 (see Figure 4-3).
- Velocities greater than 2 m/s are predicted in the DN 300 AC main coming off the Washdyke trunk main in Washdyke Flat Road through to SH1 and Meadows Road. These mains are carrying high flows greater than 150 L/s supplying the industrial growth areas and two of the three key customers. One of the key customers, Smithfield (SHEF-FH39081) is receiving pressure LoS marginally below the required 500 kPa (see Figure 4-4).

In terms of the Gleniti zone:

- The inlet and outlet pipework of the Gleniti Pump Station (PS) and the PS are undersized to meet ultimate growth. The localised pipework at Gleneti PS is experiencing a headloss of 95 m/km, with the new developments and the increased growth within the Gleniti zone. As a result, a 135 m section of pipe downstream of the Glenti PS, results in a headloss of 12.45 m and causes 28 customers to receive pressure <20 m. The development area FDA9 is located at a high elevation, and results in LoS pressure issues (see Figure 4-3).
- Similarly, the development area FDA10 is located at a high elevation and has an available static head of less than 11 m, suggesting pumping will be required to supply the demand and pressure LoS.
- An indicative estimate of the future duty flow that will be required from an upgraded Gleniti PS based on current Gleniti zone demand is 97 L/s. This assumes that the Gleniti zone peak day average demand of 48.5 L/s is supplied by the Gleniti PS over 12 hours.

Table 4-2: Timaru – Capacity Assessment Results, Peak Day Demand Pressure LoS

PERFORMANCE PARAMETER	BASE SCENARIO – NO. OF PROPERTIES	ULTIMATE GROWTH SCENARIO – NO. OF PROPERTIES
< 20 m pressure LoS	9	• 171 existing properties • FDA9, FDA10 & DEV2 • FDA1 & FDA4

Table 4-3: Timaru – Capacity Assessment Results, Peak Day Demand Pipe Headloss and Velocity

PERFORMANCE PARAMETER	BASE SCENARIO – PIPE (M) > 200 MM DIA.	ULTIMATE GROWTH – PIPE (M) > 200 MM DIA.
Max HL ≥ 5 m / km	3,121	12,965
Max. V ≥ 1.5 m/s	361	1,887

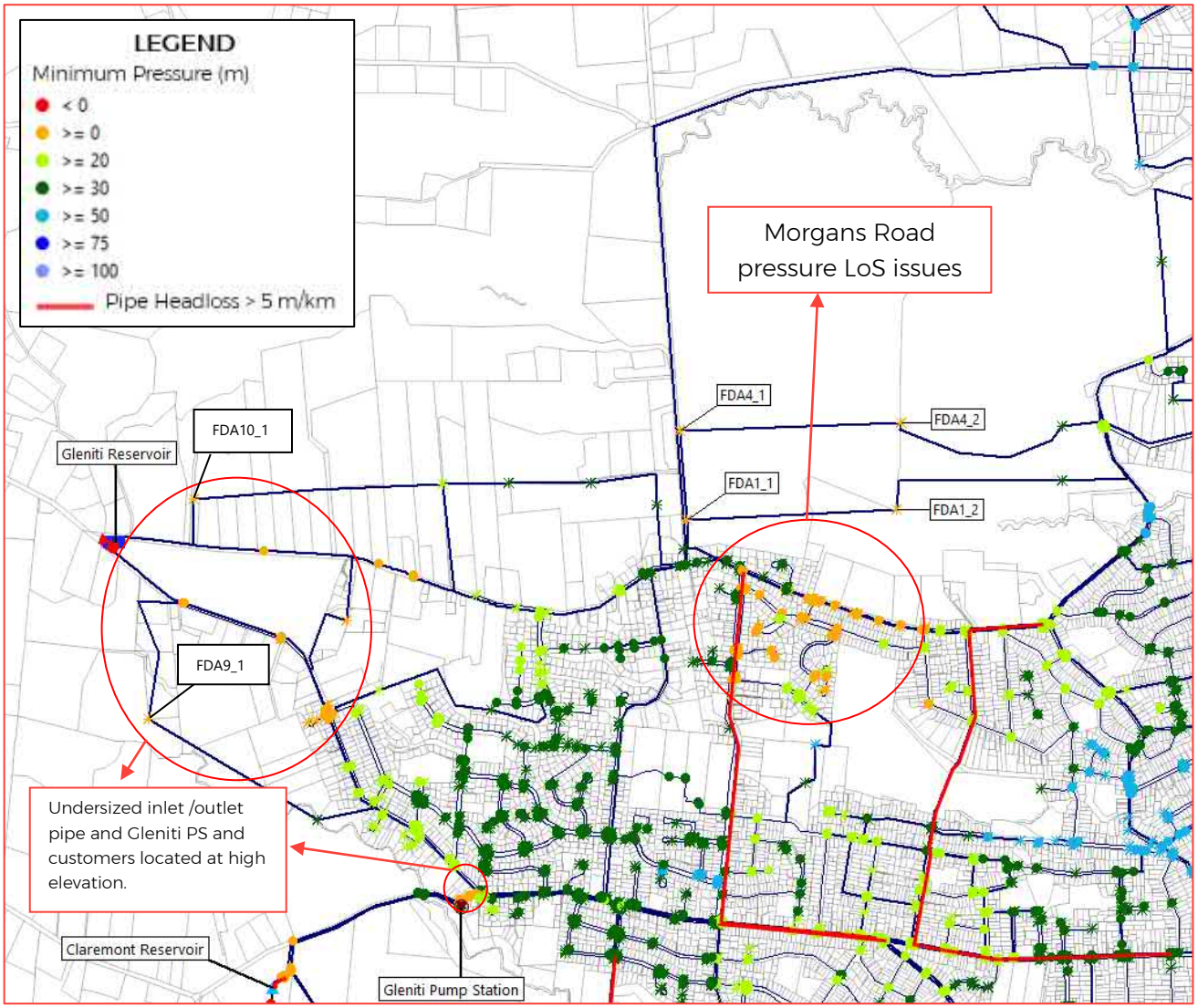


Figure 4-3: Timaru – Ultimate scenario pressure LoS issues

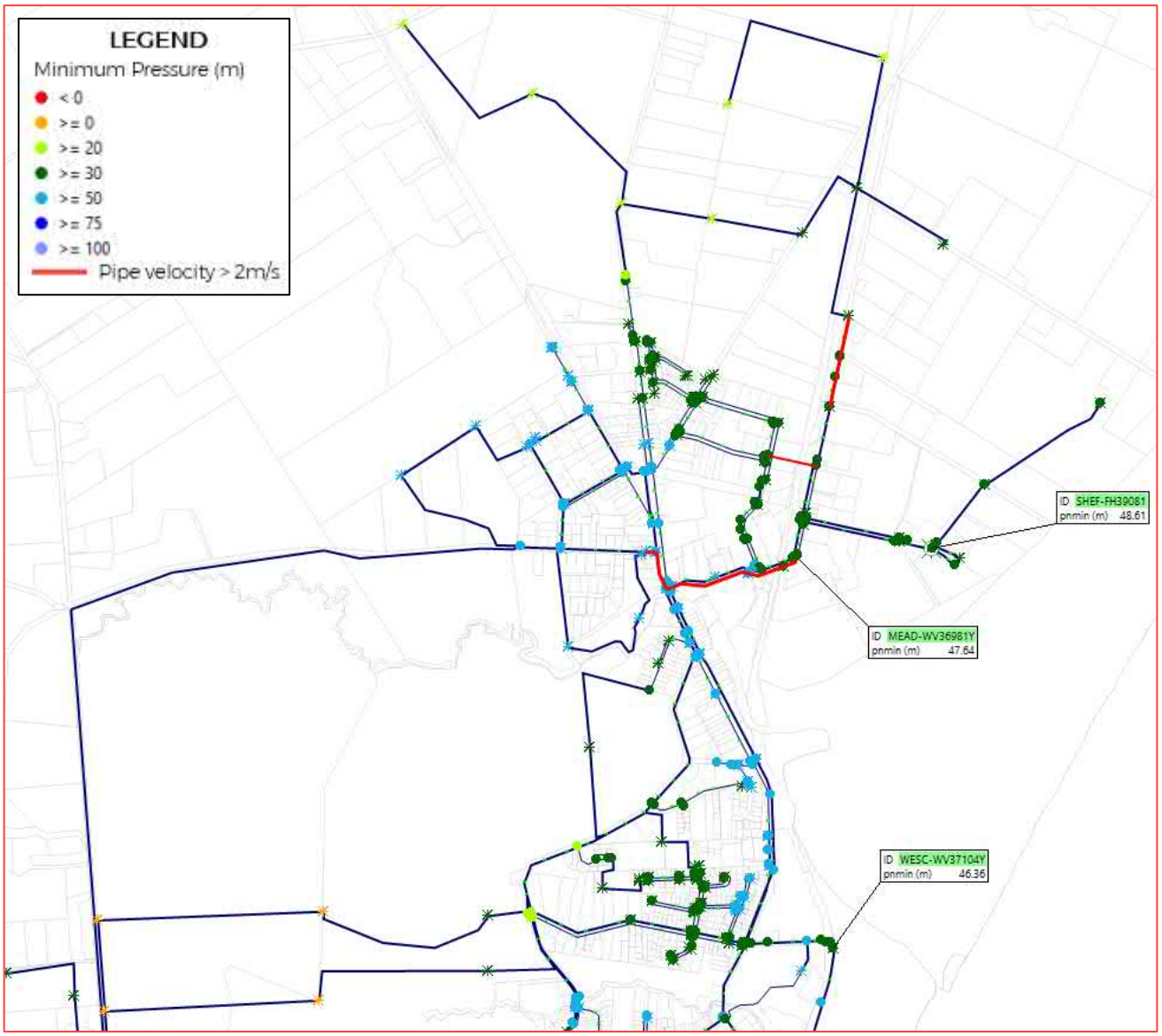


Figure 4-4: Timaru - growth model pipe network in Washdyke with velocity > 2 m/s

4.3.2.2 FIRE FLOW COMPLIANCE

Similar flows were observed during the events of FW3 requirement in the Washdyke industrial area during peak hour demand. The new trunk main is working at full capacity with flows reaching close to 200 L/s.

The model is predicting an additional 62 hydrants are failing to meet the FW2 requirement, and 71 hydrants are failing to meet the FW3 requirements, that previously passed under the current (base) scenario. However, all the hydrants located in the growth development area are passed (see Figure 4-5).

No marginally passed hydrants were observed as most failed hydrants were able to provide the minimum fire flow requirement of 25 L/s but did not meet the 10 m residual pressure requirement.

Overall, approximately 29% of the total hydrants do not meet the FW2 and FW3 requirements. Appendix A presents the results for the fire flow compliance assessment for Timaru.

Table 4-4: Timaru Capacity Assessment Results – FW2 & FW3

PERFORMANCE PARAMETER	BASE SCENARIO	ULTIMATE GROWTH SCENARIO – FW2	ULTIMATE GROWTH SCENARIO FW3 (Washdyke)	ULTIMATE GROWTH SCENARIO FW3 (Timaru CBD)
No. hydrants 'Pass'	1,680	1,656	1,647	1,647
No. hydrants 'Marginal'	0	0	0	0
No. hydrants 'Fail'	410	471	480	480

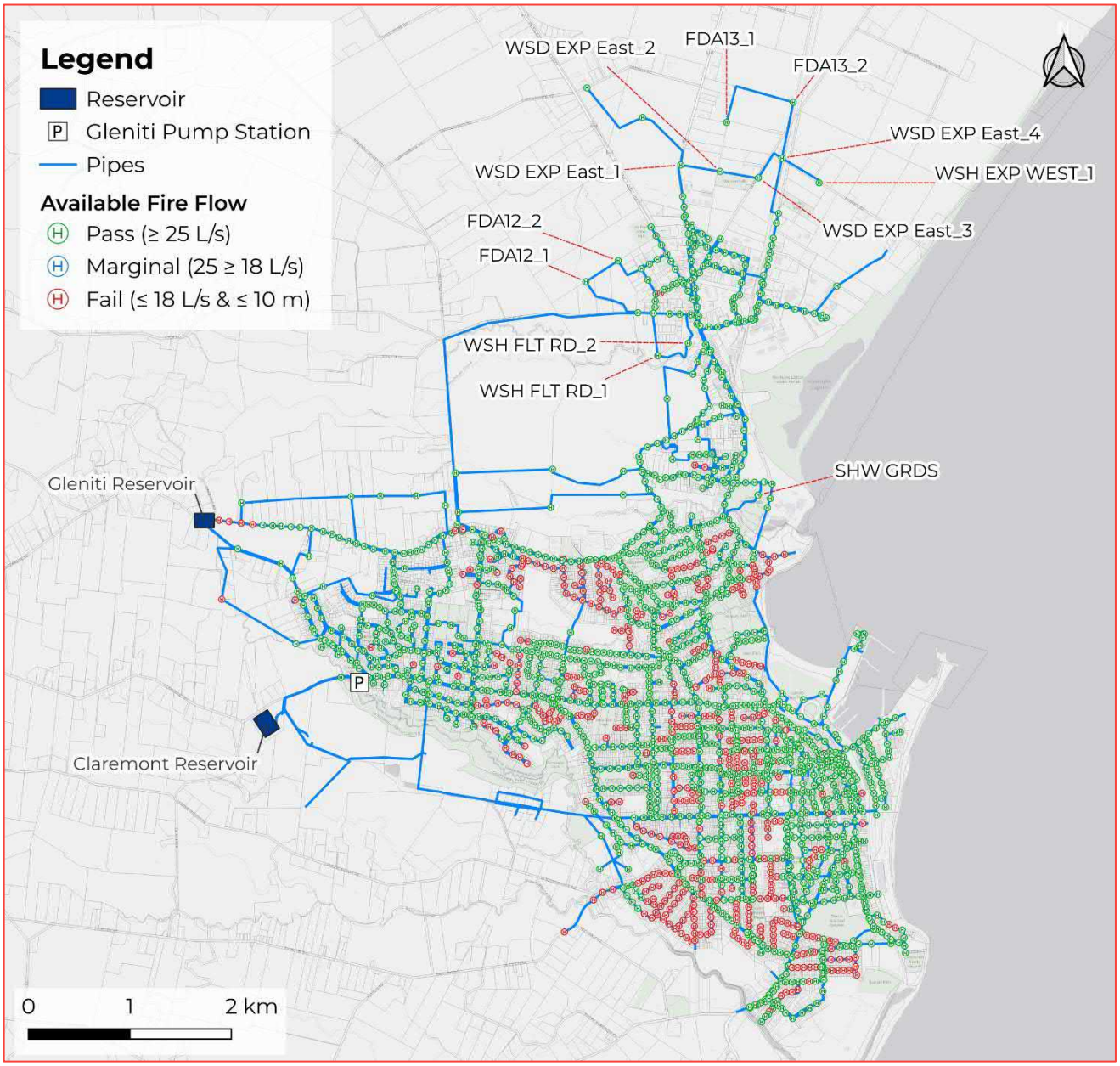


Figure 4-5: Timaru - FW3 fire flow results (ultimate – Washdyke)

4.3.3 TEMUKA

4.3.3.1 SYSTEM PERFORMANCE

The Temuka reticulation does not have any pressure LoS issues for the base and ultimate growth scenarios.

4.3.3.2 FIRE FLOW COMPLIANCE

In Temuka the majority of hydrants are compliant with 36 hydrants failing in the base scenario. However, improved results were observed for the ultimate growth scenario with only 32 hydrants predicted to fail. This was due to the incorporation of the new pipe for supplying the FDA6 growth area that has passed the fire flow compliance of the existing four hydrants, that were previously failing (see Figure 4-7).

No marginally passed hydrants were observed as the majority of failed hydrants were able to provide the minimum fire flow requirement of 25 L/s but did not meet the 10 m residual pressure requirement.

Table 4-5: Temuka - Capacity Assessment Results, FW2 Fire Flow

PERFORMANCE PARAMETER	BASE SCENARIO	ULTIMATE GROWTH SCENARIO
No. hydrants 'Pass'	321	331
No. hydrants 'Marginal'	0	0
No. hydrants 'Fail'	36	32

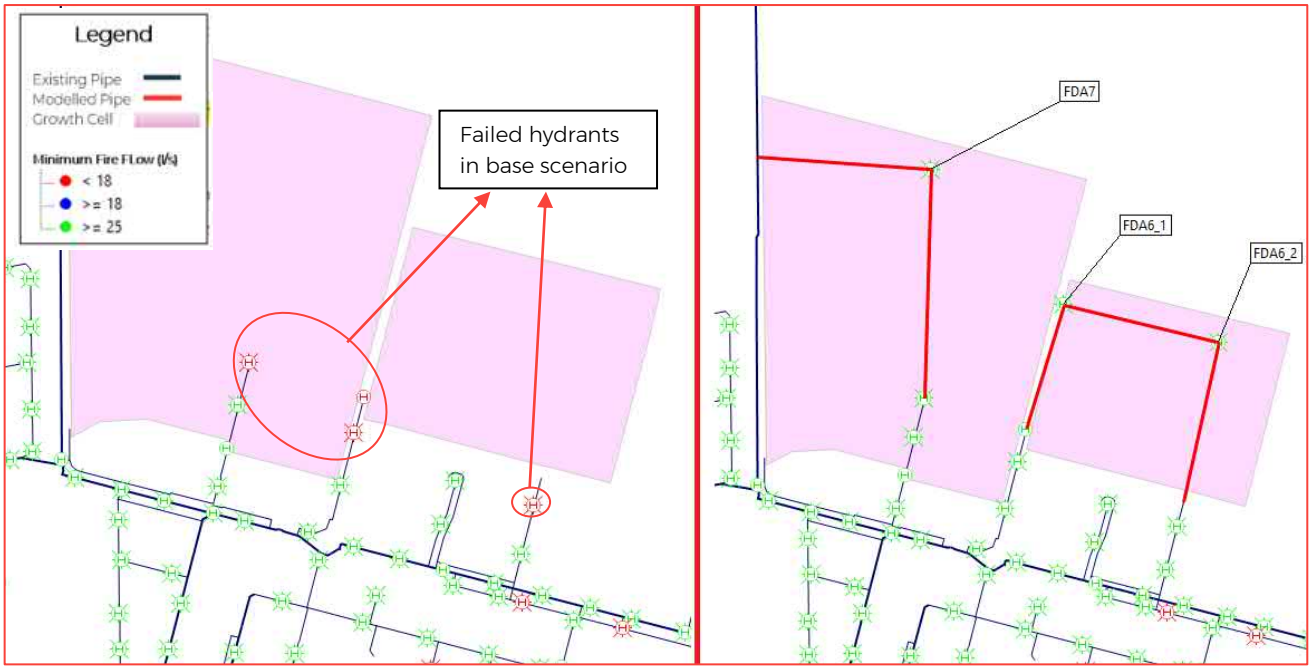


Figure 4-6: Temuka - improved hydrants performance (four no.) with new modelled pipes for growth areas

4.3.4 TIMARU PIPE UPGRADES

We have identified that upgrading the DN 300 Morgans Road pipe with a DN 500 PE 100 PN12.5 pipe will resolve the pressure LoS issues for the existing and new growth development of FDA1 and FDA4 supplied by Claremont reservoir. However, four properties on Morgans Road will still require a boost in pressure to meet the pressure LoS requirement during peak instantaneous demands. The new DN 500 Morgans Road main is also predicted to resolve the pressure LoS at Smithfield (SHEF-FH39081) and further improve the system performance as per Figure 4-7.

An assessment of pipe upgrades to the undersized inlet and outlet pipes at Gleniti PS indicates that pressure LoS issues remain for the existing 26 properties and the new growth areas of FDA9, FDA10, and DEV2. While pressure LoS is achieved for FDA2, the Gleniti reservoir level is not maintained with this additional demand, therefore we do not recommend connecting this development at this point. Further investigation is required to identify the Gleniti PS and pipe upgrade required to resolve these pressure LoS issues whilst also maintaining the Gleniti reservoir level and turnover period. Additionally, this should consider:

1. Whether there are benefits to rezoning properties from the Claremont zone onto the Gleniti zone.
2. Whether additional Gleniti storage and/or chlorine contact tank volume is required.
3. General reconfiguration of how the Gleniti zone is supplied, including the location of the Gleniti PS and a dedicated trunk main to supply the reservoir.

Table 4-6: Timaru Capacity Assessment Results after Upgrades – Pressure LoS

PERFORMANCE PARAMETER	BASE SCENARIO - NO. OF PROPERTIES	ULTIMATE GROWTH – NO. PROPERTIES	ULTIMATE GROWTH W UPGRADES – NO. PROPERTIES
< 20 m pressure LoS	9	• 171 existing • FDA9, FDA10 & DEV2 • FDA1 & FDA4	• 30 existing properties • FDA9, FDA10 & DEV2

Table 4-7: Timaru Capacity Assessment Results after Upgrades – Velocity and Headloss

PERFORMANCE PARAMETER	BASE SCENARIO - PIPES > 200 MM DIA. (M)	ULTIMATE GROWTH - PIPES > 200 MM DIA (M)	ULTIMATE GROWTH WITH DEVELOPMENT UPGRADES – PIPES > 200 MM DIA (M)
Max HL ≥ 5 m / km	3,121	12,965	8,102*
Max. V ≥ 1.5 m/s	361	1,887	1,587

*It should be noted that if the 1.5 km of DN 500 Morgans Road pipe upgrade is progressed first, the total length of the remaining underperforming pipe network is predicted to be 8,102 m as presented in Table 4-7.

Appendix B presents a full list of the pipe upgrades required to resolve the headloss and velocity issues identified in Table 4-7.

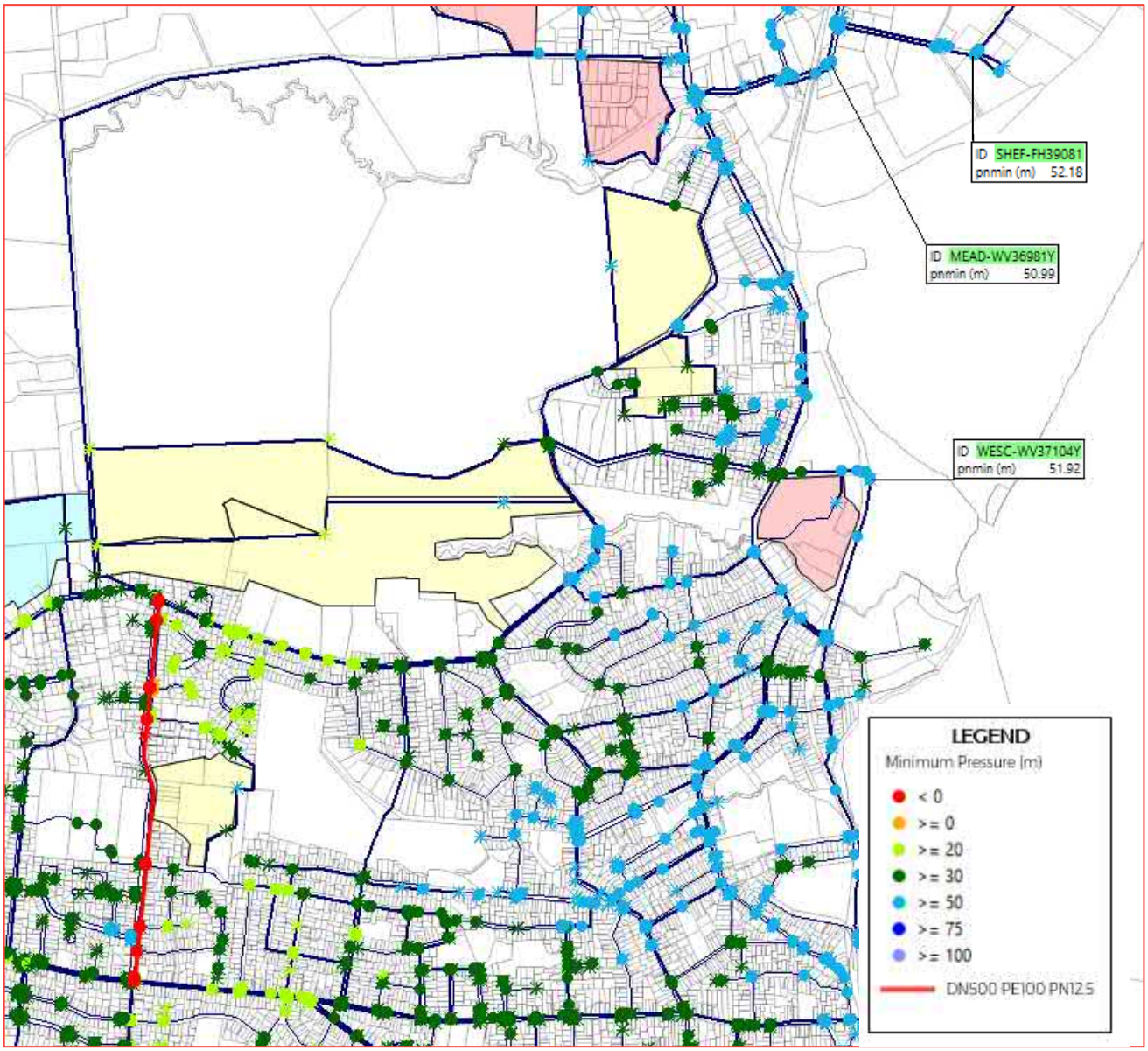


Figure 4-7: Timaru - improved system performance from new DN 500 main in Morgans Road

5 DEVELOPMENT PHASING

5.1.1 TIMARU

A summary of which growth areas in Timaru can go ahead before the network needs to be upgraded is summarised in Table 5-1, and a plan showing these growth areas and staging is provided in Appendix C.

The total number of 200 residential lots that can be developed between FDA1 and FDA4 has been based on 12 lots per hectare, with the developable land area being 60% of 30 ha which is estimated to have a ground elevation of 45 m or less.

Table 5-1: Timaru - Categorisation of growth areas that can be developed prior to the recommended upgrades

REF / NAME	DEVELOPMENT CAN PROCEED BEFORE UPGRADES
FDA1 Elloughton Road South	A total of 200 lots shared with FDA4 at east side nr. Old North Rd / Jellicoe St
FDA2 Kellands Heights East	No – detailed assessment of Gleniti zone and upgrade to Gleniti PS required
FDA4 Elloughton Road North	A total of 200 lots shared with FDA1 at east side nr. Old North Rd / Jellicoe St
FDA14 Kennels Road	Yes
DEV1 Broughs Gully	Yes
DEV2 Gleniti Residential	No – detailed assessment of Gleniti zone and upgrade to Gleniti PS required
FDA9 Gleniti North	No – detailed assessment of Gleniti zone and upgrade to Gleniti PS required
FDA10 Kellands Heights West	No – detailed assessment of Gleniti zone and upgrade to Gleniti PS and required
FDA12 Sir Basil Arthur Park	Yes
FDA13 Seadown Road	Yes
DEV3 Washdyke Expansion	Yes
Washdyke Flat Road	Yes
Showgrounds	Yes
Ascot Street	Yes
St. Vianneys	Yes

REF / NAME	DEVELOPMENT CAN PROCEED BEFORE UPGRADES
Grey Road	Yes
O'Neill Place	Yes
O'Neill Place Extension	Yes
College Road	Yes

5.1.2 TEMUKA

A summary of the growth areas in Temuka which can go ahead without upgrades to the network is shown in Table 5-2, and a plan showing these growth areas is provided in Appendix C.

Table 5-2: Temuka - Categorisation of growth areas that can be developed prior to the recommended upgrades

REF / NAME	DEVELOPMENT CAN PROCEED BEFORE UPGRADES
FDA6 Factory Road	Yes
DEV3 Temuka Northwest	Yes
FDA7 Thompson	Yes

6 CONCLUSIONS AND RECOMMENDATIONS

Temuka

1. No pressure LoS issues are predicted for Temuka. Once the Temuka reservoir and pump station are commissioned the Temuka future development areas can be connected to the existing reticulation.
2. The 2015 Temuka Water Supply Strategy was based on an ultimate demand of 4.5 ML/d. With the latest growth, this has increased to 4.7 ML/d.
3. The ultimate PDD of 4.7 ML/d will result in a turnover at the new 4 ML Temuka reservoir of 20 hours.

Timaru

1. The additional residential and commercial growth results in a significant increase in customers predicted to have pressure LoS below 20 m – from nine to 171 properties.
2. Pressure LoS issues are predicted at FDA9 (Gleniti North), FDA10 (Kellands Heights West), and DEV2 (Gleniti Residential).
3. The Gleniti PS capacity is exceeded, and the inlet and outlet pipework to the PS are undersized. This results in pressure LoS issues for an existing 26 properties. Further investigation is required to confirm the optimal upgrade for the Gleniti PS. This should consider whether there are additional benefits to rezoning Claremont customers onto the Gleniti zone (e.g., Carlisle Place), along with a review of the storage and contact time at the Gleniti reservoir site. We recommend that all the development areas in the Gleniti zone are put on hold until this has been investigated further.
4. Pressure LoS issues are predicted at FDA1 (Elloughton Road South) and FDA4 (Elloughton Road North). This can be resolved by upgrading the existing DN 300 CI main in Morgans Road to DN 500 PE 100 PN12.5. This upgrade also resolves the pressure LoS issue of the key customer Smithfield and further improves system performance.
5. Some development (total 200 lots) for FDA1 and FDA4 can progress in advance of the upgrade to the DN 300 CI main in Morgans Road. However, this will need to be located in the lower ground elevation areas close to Old North Road / Jellicoe Street.
6. Four properties in Carlisle Place are still predicted to have pressure LoS issues after the Morgans Road upgrade.
7. Previous growth assessment and the 2015 Timaru Water Supply Strategy was based on an ultimate demand of 35 ML/day based on existing Timaru sources (Opihi and Pareora) availability. With the latest growth, this has increased to 40 ML/d. It is recommended that a review of the future strategy for Timaru is undertaken to consider, for example:
    a. The demand management that could be achieved from universal metering which TDC currently has programmed to be implemented over 2025-2029.

b Whether demand in Washdyke can be reduced through water-saving initiatives such as greywater recycling or more efficient water use measures by commercial and industrial consumers.

8 The ultimate PDD of 40.4 ML/d will result in a turnover at the Claremont reservoir (2 x 114 ML) of 5.6 days.

7 LIMITATIONS

This report ('Report') has been prepared by WSP New Zealand Limited ('WSP') exclusively for Timaru District Council ('Client') in relation to a capacity assessment for Timaru and Temuka ('Purpose') and in accordance with the existing *ACENZ Form of Agreement for Engagement of Consultant between Timaru District Council and WSP* signed 29 April 2011 and *Offer of Service dated 29 August 2023 for 'Timaru and Temuka Growth Capacity* Assessment' ('Agreement'). The findings in this Report are based on and are subject to the assumptions specified in the Report and the Offer of Services dated August 2023. WSP accepts no liability whatsoever for any use or reliance on this Report, in whole or in part, for any purpose other than the Purpose or for any use or reliance on this Report by any third party.

In preparing this Report, WSP has relied upon data, surveys, analyses, designs, plans and other information ('Client Data') provided by or on behalf of the Client. Except as otherwise stated in this Report, WSP has not verified the accuracy or completeness of the Client Data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in this Report are based in whole or part on the Client Data, those conclusions are contingent upon the accuracy and completeness of the Client Data. WSP will not be liable for any incorrect conclusions or findings in the Report should any Client Data be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP.

APPENDIX A - RESULTS

RESULTS – TIMARU PRESSURE LOS

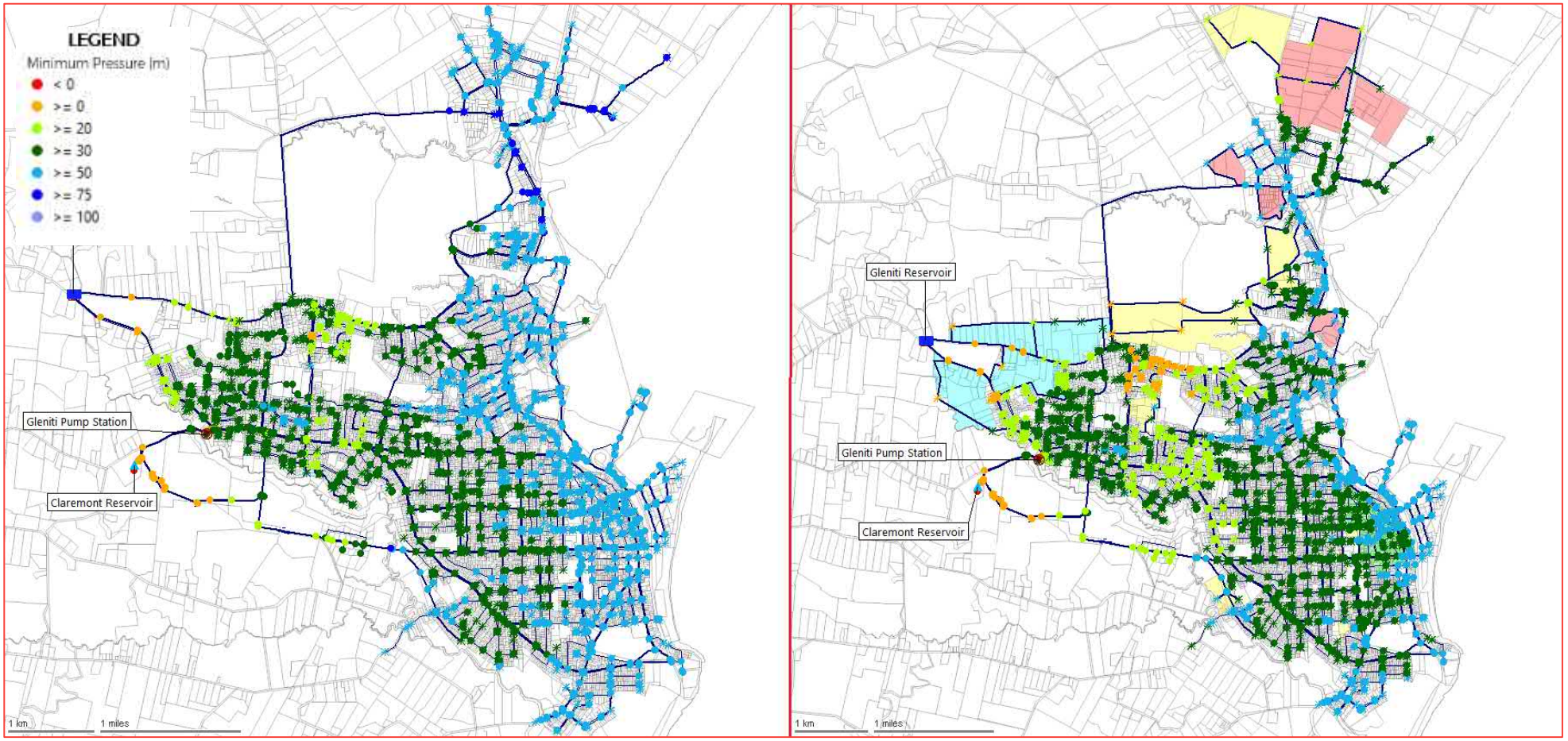


Figure 1: Timaru – comparison of pressure LoS (base model vs ultimate model)

RESULTS – TIMARU FIRE FLOW

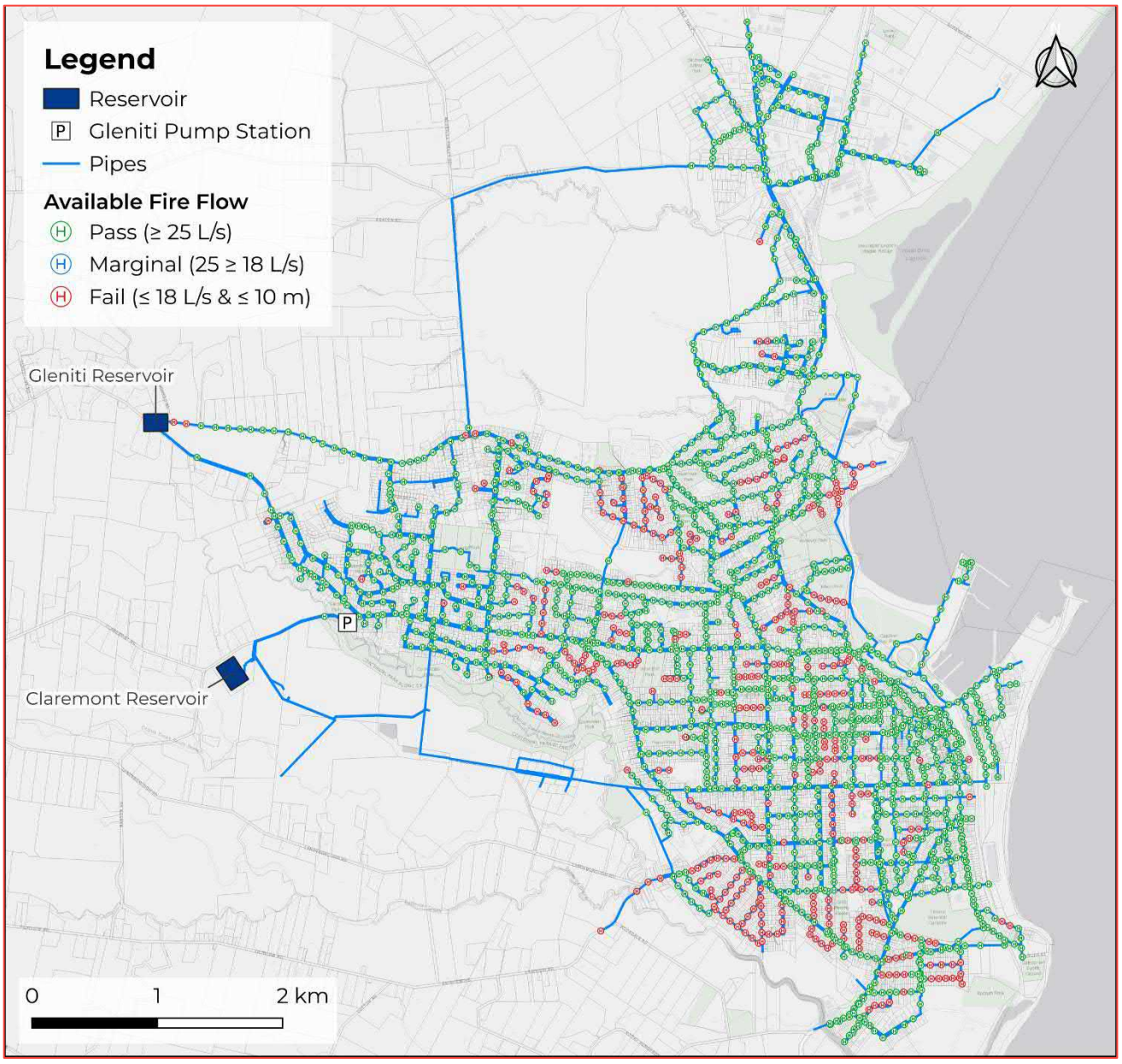


Figure 2: FW2 - base scenario

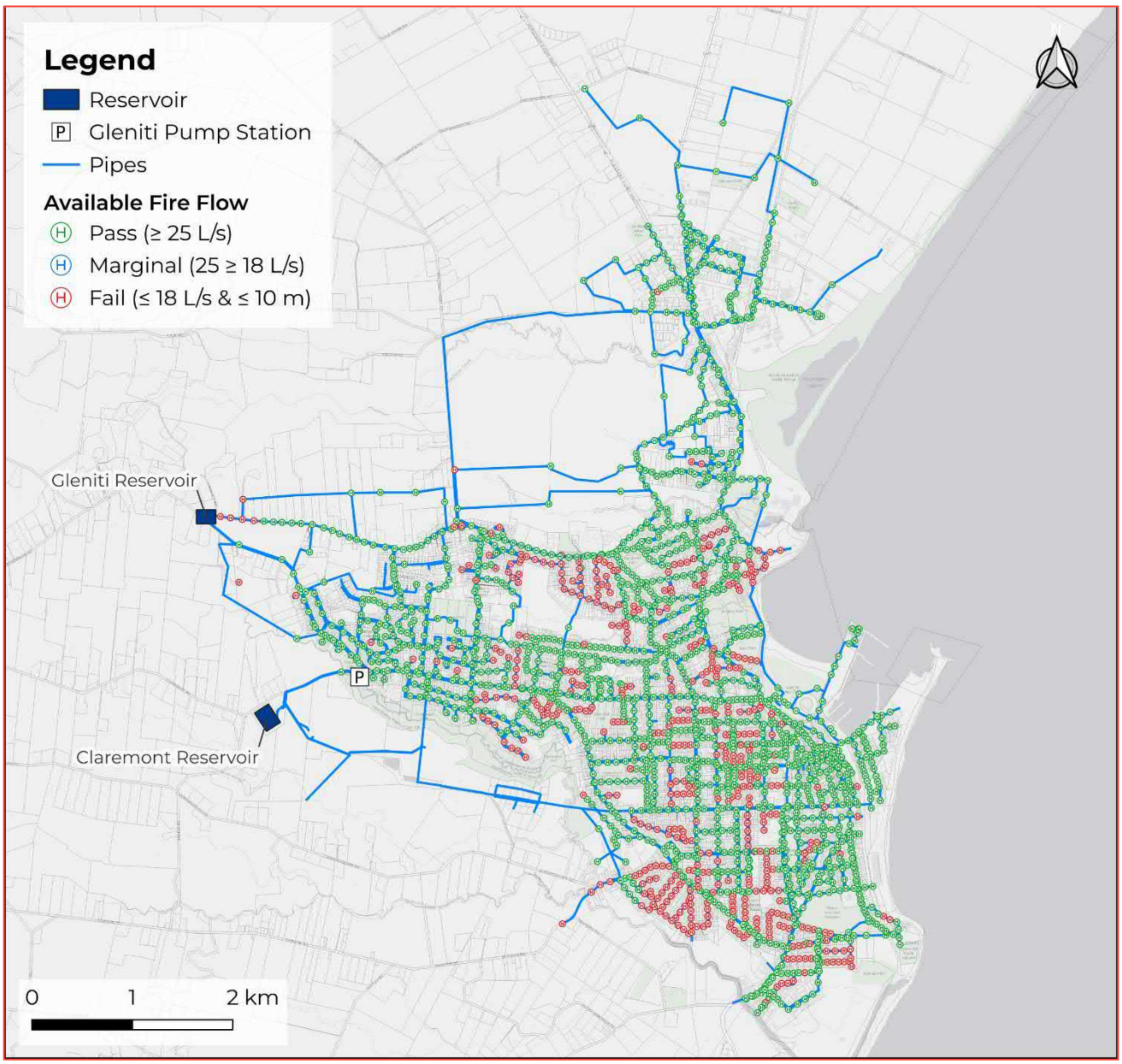


Figure 3: FW2 - ultimate scenario

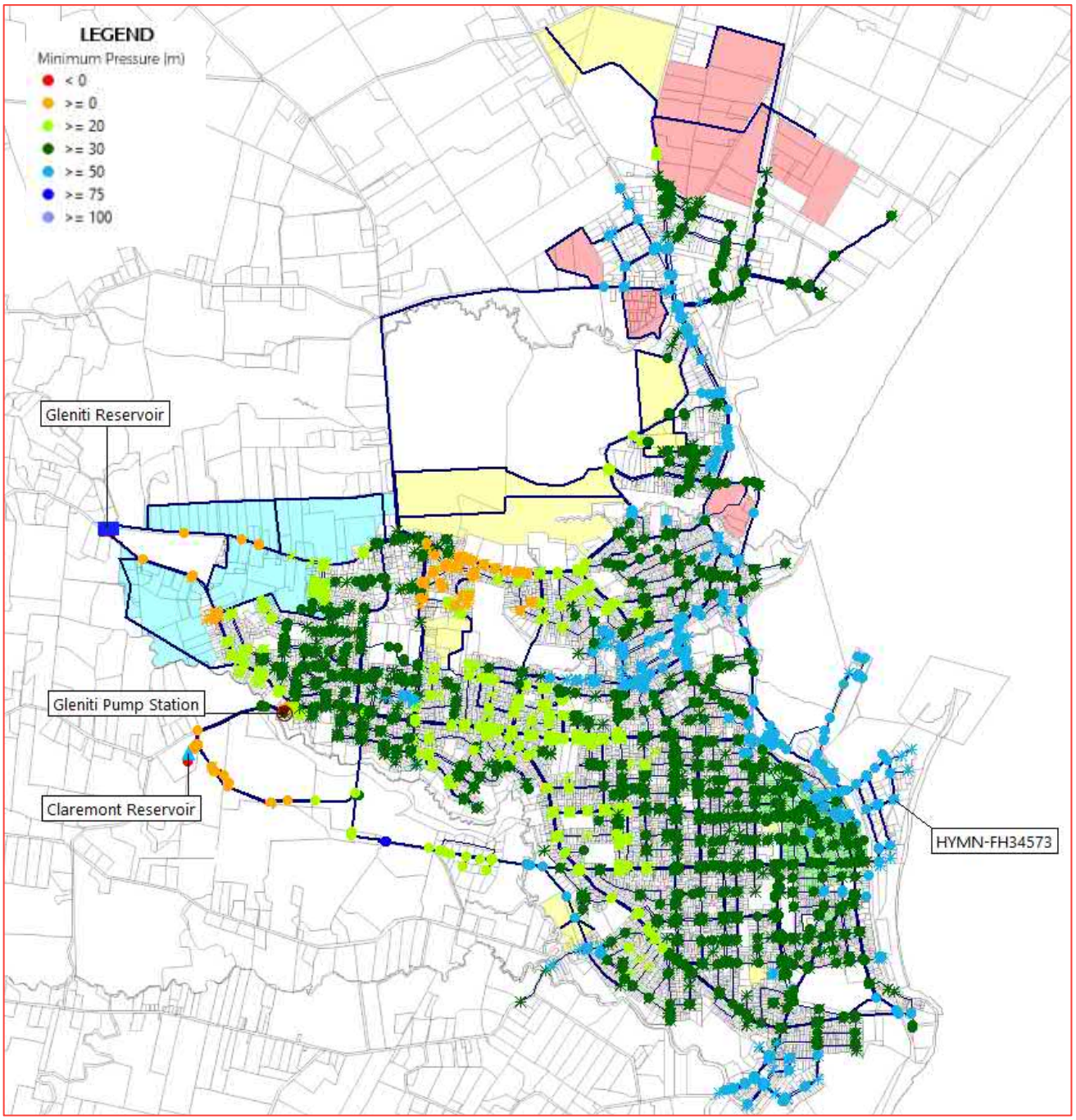


Figure 4: FW3 - ultimate scenario (CBD)

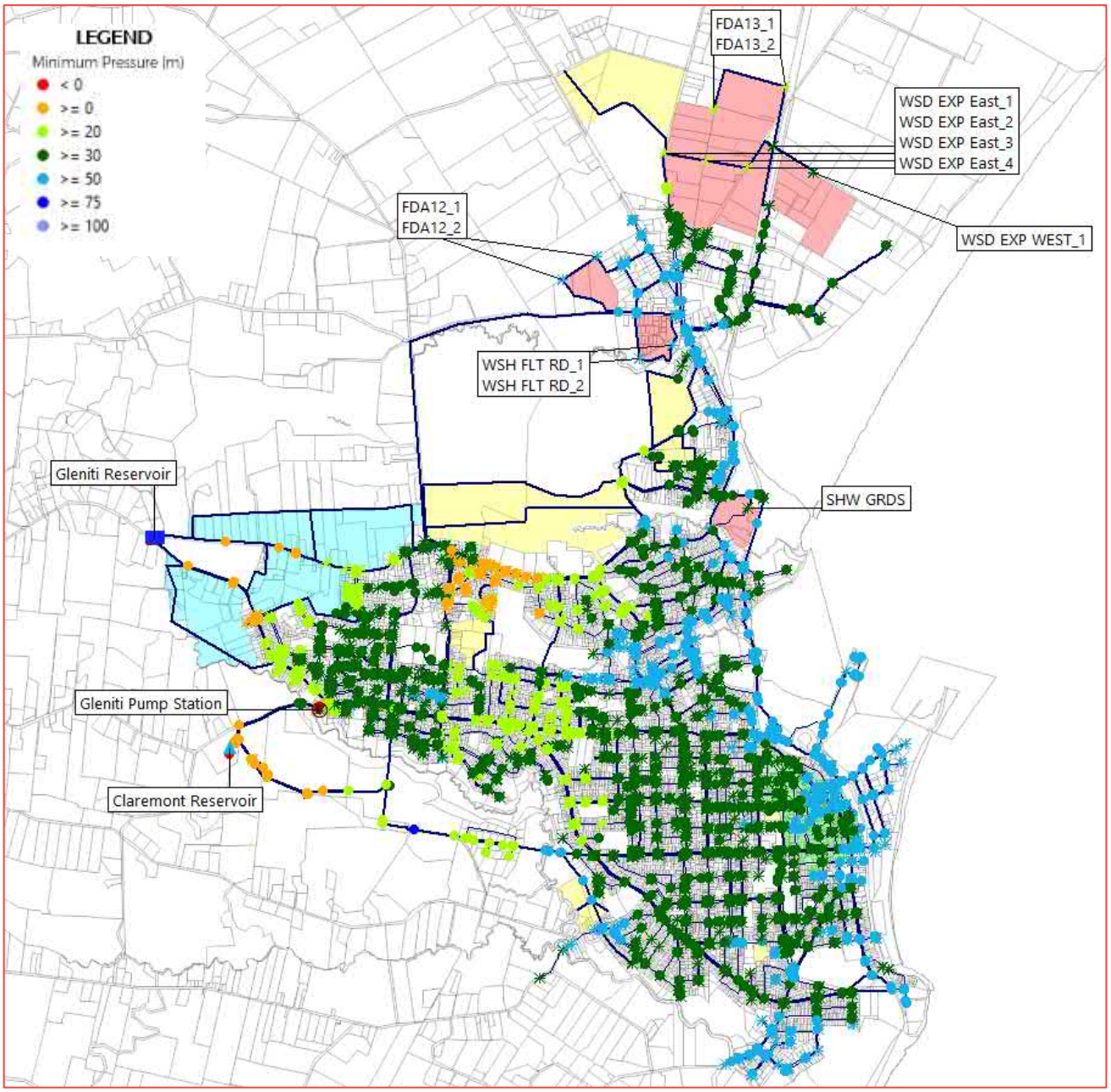
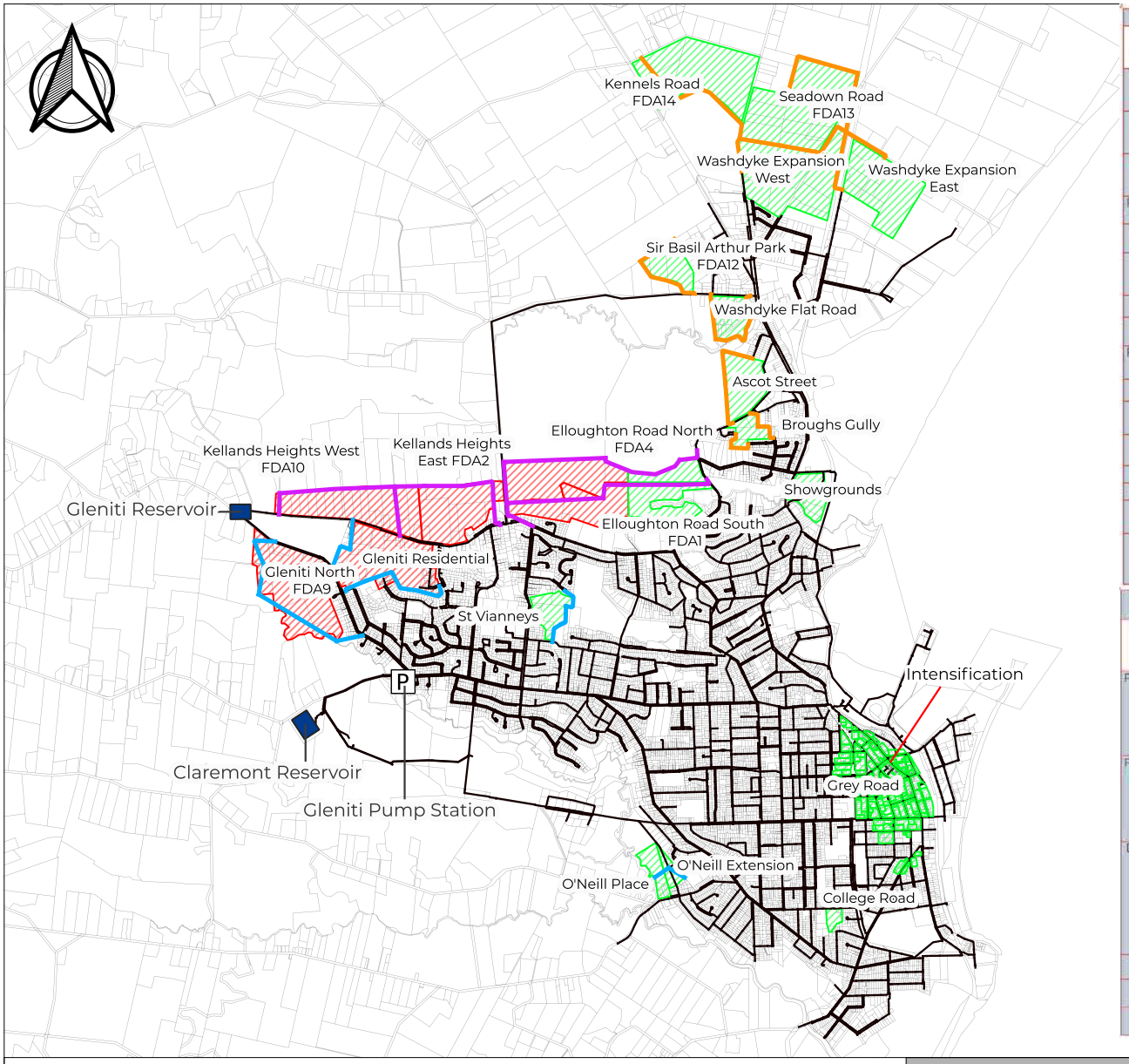


Figure 5: FW3 - ultimate scenario (Washdyke)

APPENDIX B – TIMARU PIPE UPGRADES

TABLE TO BE APPENDED ONCE TDC HAVE ADDED DATA

APPENDIX C – DEVELOPMENT PHASING



RESIDENTIAL						
REF	NAME	TYPE	NO. LOTS	AVG PDD (L/S)	PEAK DEMAND INC. LEAKAGE (L/S)	GROWTH NODE ID & ELEVATION (M)
FDA1	Elloughton Road South	Future	598	6.7	16.5	FDA1_1 = 56 m FDA1_2 = 49 m FDA1_3 = 25 m
FDA2	Kellands Heights East	Future	440	4.9	12.1	FDA2_1 = 65 m FDA2_2 = 60 m FDA2_3 = 52 m
FDA4	Elloughton Road North	Future	542	6.1	14.9	FDA4_1 = 50 m FDA4_2 = 50 m FDA4_3 = 31 m
FDA14	Kennels Road	Future	646	7.2	17.8	FDA14_1 = 13 m FDA14_2 = 16 m
DEV1	Broughs Gully	Confirmed	200	2.2	5.5	DEV1_1 = 21 m DEV1_2 = 30 m
DEV2	Gleniti Residential	Consented	700	9.5	23.0	DEV2_1 = 81 m DEV2_2 = 79 m DEV2_3 = 63 m
RURAL RESIDENTIAL						
FDA9	Gleniti North	Future	102	1.4	3.4	FDA9_1 = 90 m FDA9_2 = 58 m
FDA10	Kellands Heights West	Future	88	1.2	2.9	FDA10_1 = 90 m FDA10_2 = 70 m
COMMITED DEVELOPMENT - RESIDENTIAL						
iii	Ascot Street	Rural Residential	160	1.8	2.1	ASC ST = 12 m
iv	St Vianneys	Residential	92	1.0	1.2	St. Viny_1 = 23 m St. Viny_2 = 36 m
v	Grey Road	Residential	48	0.5	0.6	CHPL-FH34790 = 19 m
vi	O'Neill Place	Residential	84	0.9	1.1	O'Neil = 8 m
vii	O'Neill Place Extension	Residential	48	0.5	0.6	O'Neil Ext = 25 m
viii	College Road	Medium Density Residential	45	0.5	0.6	COLG-FH34931 = 12 m

COMMERCIAL							
REF	NAME	TYPE	AREA (Ha)	USE	AV. PDD (L/s)	PEAK DEMAND (L/s)	GROWTH NODE ID & ELEVATION (m)
FDA12	Sir Basil Arthur Park	Future	13.3	Light, with potential for wet industries (Medium used)	6	13	FDA12_1 = 10 m FDA12_2 = 8 m
FDA13	Seadown Road	Future	61.0	Light, w potential for wet industries (Medium used)	26	59	FDA13_1 = 11 m FDA13_2 = 9 m
DEV3	Washdyke Expansion	Confirmed	56.1	East – heavy industry	44	101	WSD EXP East_1 = 11 m WSD EXP East_2 = 10 m WSD EXP East_3 = 9 m WSD EXP East_4 = 8 m
			36.7	West – light industry only	9	20	WSH EXP WEST_1 = 6 m
COMMITTED - COMMERCIAL							
i	Washdyke Flat Road	Committed	12.5	Light Industrial	3.0	6.9	WSH FLT RD_1 = 5 m WSH FLT RD_2 = 2 m
ii	Showgrounds	Committed	12.1	Light Industrial	9.4	21.6	SHW GRDS = 10 m

Existing Pipes

No Capacity for Growth

Full Capacity for Growth

Growth Pipes

DN180 PE100 PN12.5

DN200 PE100 PN12.5

DN400 PE100 PN12.5

Christchurch Water
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8140
New Zealand

PROJECT

Timaru District Council
2 King George Place, Timaru, 7910
Timaru and Temuka Growth Assessment

SHEET

Timaru Development Phasing Centre

DRAWN	APPROVED			
J. Simpson	G. Cooper			
SHEET NUMBER	SCALE	PROJECT NUMBER	REVISION DATE	REVISION
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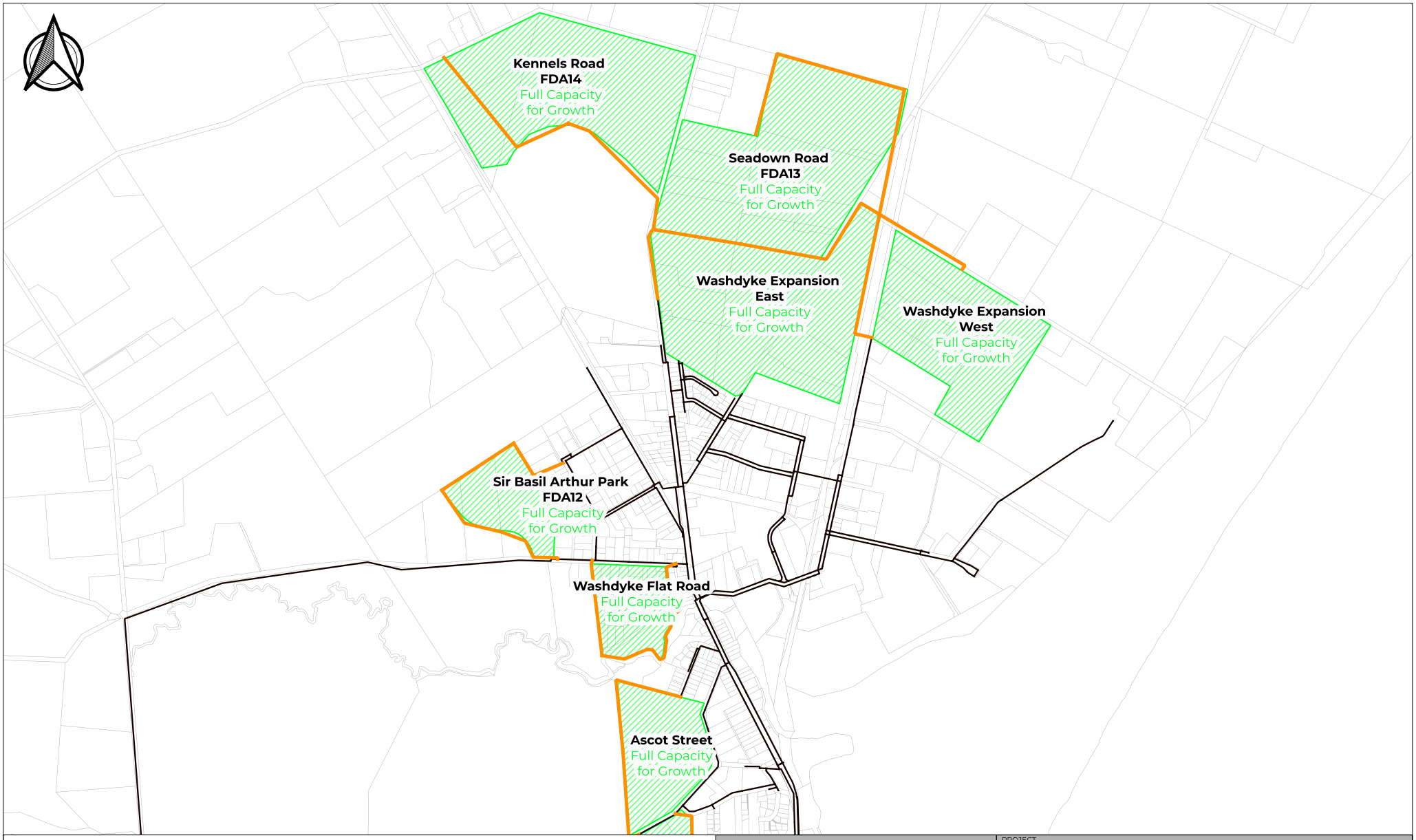

Existing Pipes

Full Capacity for Growth

Growth Pipes

DN400 PE100 PN12.5

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New Zealand

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PROJECT

Timaru District Council
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SHEET

Timaru Development Phasing North

PROJECT NUMBER	REVISION DATE	REVISION
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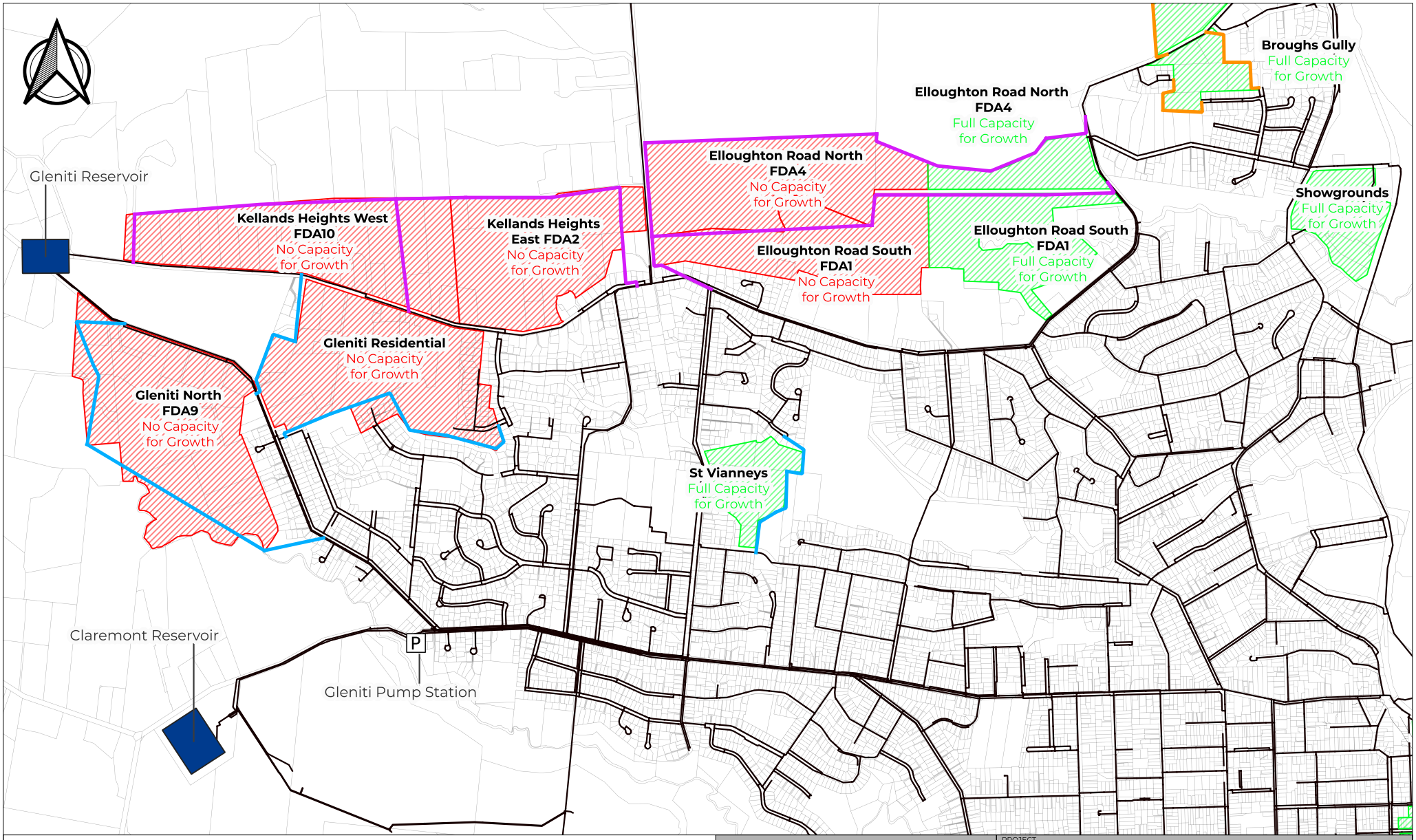

Existing Pipes
No Capacity for Growth
Full Capacity for Growth

Growth Pipes
DN180 PE100 PN12.5
DN200 PE100 PN12.5
DN400 PE100 PN12.5

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Timaru Development Phasing Centre	

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J. Simpson	G. Cooper			
SHEET NUMBER	SCALE	PROJECT NUMBER	REVISION DATE	REVISION
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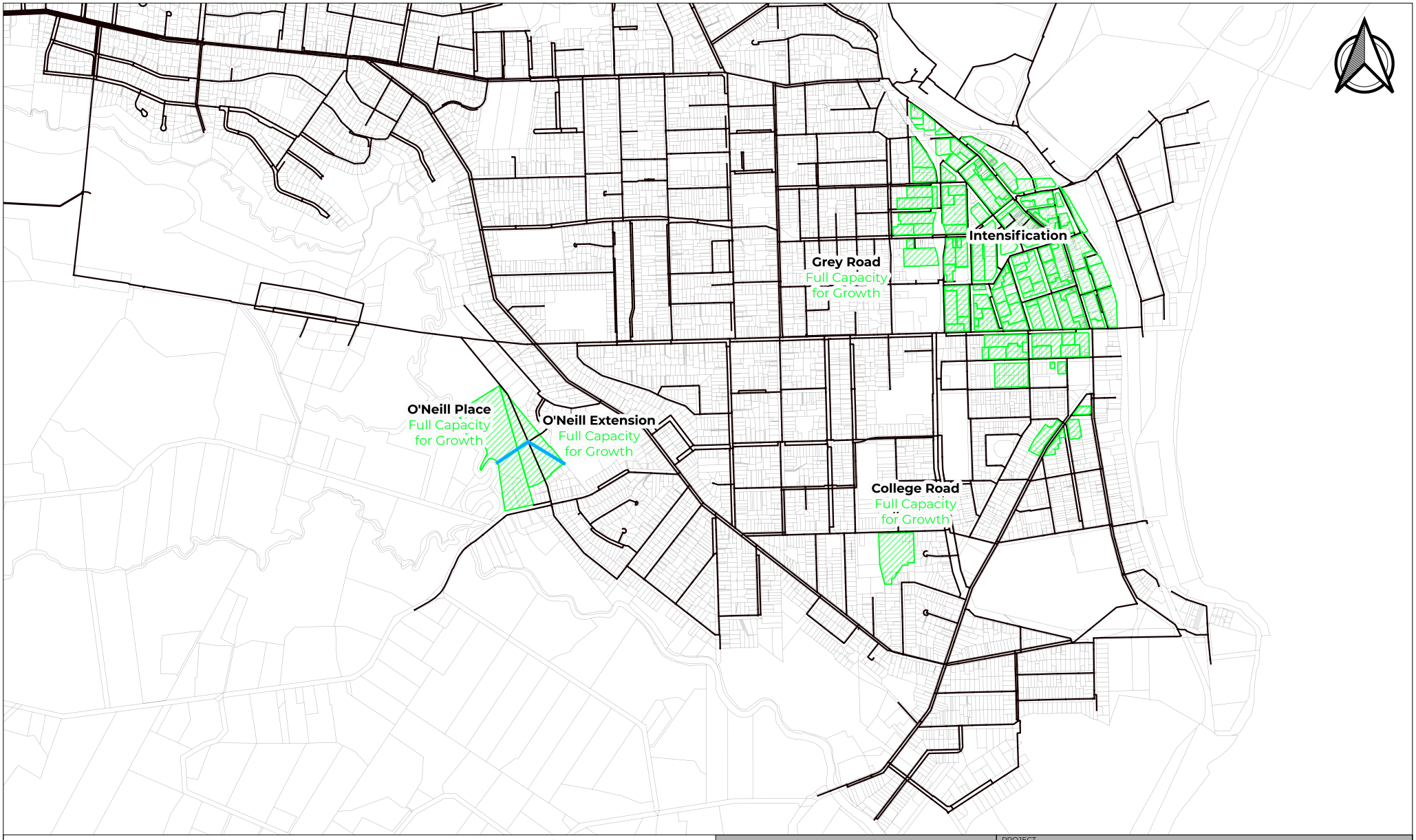

Existing Pipes

Full Capacity for Growth

Growth Pipes

DN180 PE100 PN12.5

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Timaru Development Phasing South

PROJECT NUMBER	REVISION DATE	REVISION
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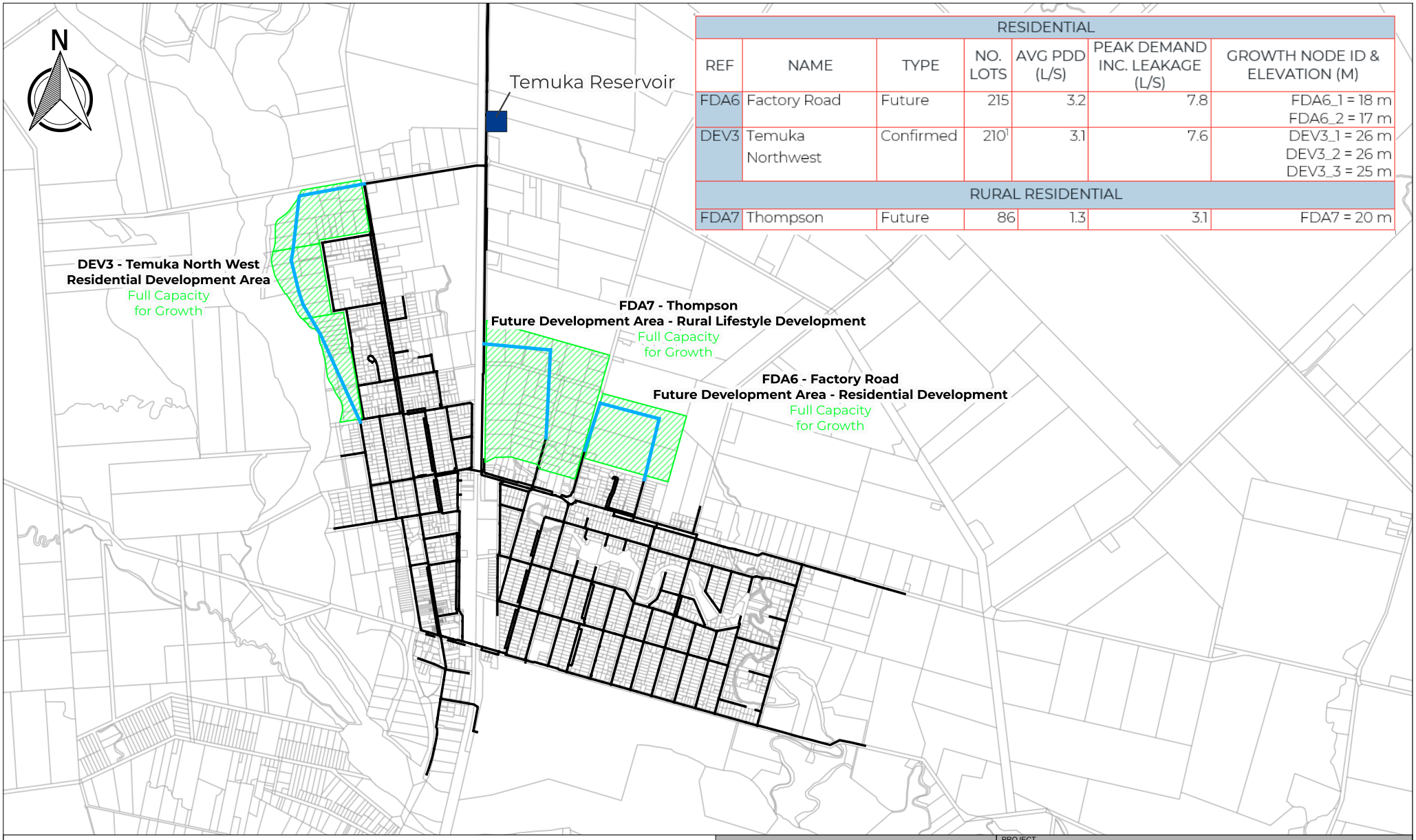

RESIDENTIAL						
REF	NAME	TYPE	NO. LOTS	AVG PDD (L/S)	PEAK DEMAND INC. LEAKAGE (L/S)	GROWTH NODE ID & ELEVATION (M)
FDA6	Factory Road	Future	215	3.2	7.8	FDA6_1 = 18 m FDA6_2 = 17 m
DEV3	Temuka Northwest	Confirmed	210[1]	3.1	7.6	DEV3_1 = 26 m DEV3_2 = 26 m DEV3_3 = 25 m
RURAL RESIDENTIAL						
FDA7	Thompson	Future	86	1.3	3.1	FDA7 = 20 m

Existing Pipes
Full Capacity for Growth
Growth Pipes
DN160 PE100 PN12.5

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Christchurch
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New Zealand

PROJECT
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SHEET
Temuka Development Phasing

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SHEET NUMBER	SCALE	PROJECT NUMBER	REVISION DATE	REVISION
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